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STANDARD LIMITED ASSESSMENT REPORT FOR SITE 14 QUARTERS S ZONE B CNC
CHARLESTON SC
3/1/2000
TETRA TECH

**Standard Limited
Assessment Report
for
Site 14, Quarters S**

**Zone B
Charleston Naval Complex
North Charleston, South Carolina**



**Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0092**

March 2000

**STANDARD LIMITED ASSESSMENT REPORT
FOR
SITE 14, QUARTERS S**

**ZONE B, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

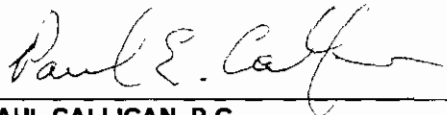
**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406**

**Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220**

**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0092**

MARCH 2000

PREPARED UNDER THE SUPERVISION OF:



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APPROVED FOR SUBMITTAL BY:



**DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA**

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Rapid Assessment for Site 14 which includes two underground storage tank (UST) systems for Quarters S Housing at Charleston Naval Complex (CNC) Zone B, in North Charleston, South Carolina. The USTs were used to store fuel oil for the boilers of Quarters S in the Naval housing area. Both 550-gallon steel USTs were removed in April 1998. The assessment was performed under the direction of the South Carolina Department of Health and Environmental Control Rapid Assessment guidance dated June 20, 1997, and approval letter dated April 7, 1999. After determining that all laboratory analytical results for groundwater and all but one analytical result for soil were below risk-based screening levels (RBSLs), the reporting format was reduced from a Rapid Assessment Report to a Standard Limited Assessment (SLA) report format. In addition, a Tier I and a Tier II Evaluation was performed for the chemical of concern (CoC) in soil which exceeded RBSL.

TtNUS performed the following actions during the Rapid Assessment:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate public and private potable wells, to locate utility line areas, to locate nearby surface water bodies, and to determine surface hydrology and drainage.
- Reviewed the previously prepared Underground Storage Tank Assessment Report for USTs S1 and S2 to determine boring locations and monitoring well placement.
- Conducted site survey to identify utilities and to construct a site plan.
- Installed nine shallow soil borings 8 to 12 feet below land surface (bls) and one deep vertical delineation soil boring to a depth of 30 feet bls using direct push technology (DPT).
- Collected soil samples for field screening using an organic vapor analyzer.
- Installed a temporary piezometer inside a selected soil boring.
- Collected soil and groundwater samples from each DPT boring for on-site mobile laboratory screening analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX); naphthalene; and diesel range organics.
- Collected and analyzed four soil samples at a fixed-base analytical laboratory for BTEX and naphthalene using U.S. Environmental Protection Agency (USEPA)

Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270.

- Collected and analyzed one soil sample for total organic carbon using USEPA Method 415.1, total recoverable petroleum hydrocarbons using USEPA Method 9071, and grain size analysis using sieve and hydrometer methods.
- Installed three shallow permanent monitoring wells to a depth of 14 feet bls using hollow stem auger.
- Collected groundwater samples from newly installed, permanent monitoring wells for laboratory analysis at a fixed-base analytical laboratory.
- Analyzed groundwater samples for BTEX, methyl tert-butyl ether, and naphthalene using USEPA Method 8260 and PAHs using USEPA Method 8270.
- Surveyed monitoring well and top of casing elevation and collected depth to groundwater measurement to evaluate groundwater flow direction.

Conclusions

Four soil samples were collected on June 2, 1999, and analyzed for BTEX and PAHs by a fixed-base laboratory. Soil concentrations were reported below RBSLs for sandy soils in all borings except one. A duplicate sample from soil boring SB-02, collected at a depth of 2 to 3 feet bls, contained one CoC above the RBSL for soil leaching (naphthalene at a concentration of 1.8 mg/kg). The duplicate result obtained for naphthalene from the laboratory analysis was used for Risk-Based Corrective Action (RBCA) Tier I and Tier II evaluations. No other soil samples contained CoCs above the RBSLs for soil leaching.

One groundwater sampling event was conducted on September 8, 1999. Three newly installed monitoring wells were sampled. No dissolved CoCs were detected in any of the wells sampled.

Tier I Evaluation

A site conceptual model identified one possible receptor with three pathways present for Site 14:

1. A construction worker in a utility trench ingesting subsurface soil and/or having dermal contact with affected subsurface soil.
2. A construction worker in a utility trench who might inhale petroleum hydrocarbon vapors emitted from newly exposed subsurface soil.
3. A construction worker in a utility trench who might ingest potentially contaminated groundwater and/or have dermal contact with groundwater contaminated by the leaching of petroleum hydrocarbons from the soil to the groundwater.

Tier II Evaluation

The maximum soil concentration of naphthalene (1.8 mg/kg) found during the site assessment does not exceed the calculated soil leaching SSTL for naphthalene (250 mg/kg). Therefore, the construction worker is not at risk if exposed to groundwater by dermal contact, incidental ingestion, and/or inhalation--regardless of downgradient distance from the source. This potential receptor is considered nonthreatened and further analysis is unnecessary.

The CoCs detected in soil at the site (naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and chrysene) are not volatile organic compounds that readily produce vapors. Because the utility lines in the area are generally shallow (i.e., less than 6 feet) there is little potential for confined space working conditions. Therefore, exposure to potential vapors emitted from subsurface soil while a construction worker is working in a utility trench was not considered further.

Soil concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene in soil boring SB02D (duplicate sample) exceeded the RBSLs for ingestion or dermal contact of the impacted soil. However, the RBSLs provided in the RBCA

Guidance assume that a commercial worker will have exposure duration for 25 years having an exposure frequency of 250 days per year. A construction worker would be expected to have a much lower exposure duration and exposure frequency based on the nature of utility, construction, or remediation work. The exposure frequency can be assumed to be 90 days/year or less and the exposure duration can be assumed to be one year or less. These assumptions are based on the nature of typical utility-type work. Furthermore, the maximum source concentration of benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h) anthracene detected in soil exceeds the RBSLs by a slight amount. Therefore, benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h) anthracene are not considered a threat to a construction worker in a utility trench. A construction worker ingesting or contacting impacted soil is not considered at-risk and the dermal/ingestion pathway is not considered for further analysis.

Recommendations for Further Action

Fixed-base analytical results of the sample collected from soil boring SB-02D (duplicate sample) revealed benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene at concentrations that exceeded the RBSLs for ingesting or contacting the impacted soil. Because of the greatly reduced potential exposure frequency (an estimated 90 days for a one-year period instead of the RBCA model of 250 days for a 25-year period), the construction worker ingesting or contacting impacted soil is not considered at-risk. Preparation of an Intrinsic Corrective Action Plan is recommended.

Southern Division, Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

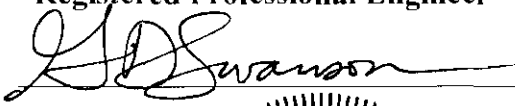
STANDARD LIMITED ASSESSMENT REPORT

Site 14
Housing Quarters S
1545 Hobson Avenue
Charleston Naval Base Complex
North Charleston, South Carolina 29405-2413

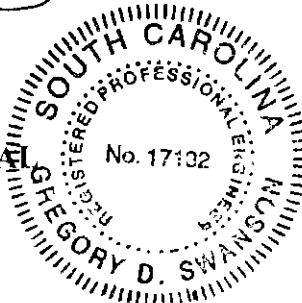
Site ID # 01089

Submitted to:
Bureau of Underground Storage Tank Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

This report has been reviewed by:

Name	Gregory D. Swanson, P.E.	17132	1/24/2000
	Registered Professional Engineer	Registration #	Date
Signature			1/24/2000
			Date

REGISTERED
PROFESSIONAL SEAL



SCDHEC Certificate # 24

STANDARD LIMITED ASSESSMENT REPORT OF FINDINGS

I INTRODUCTION

A. Owner/Operator Information

Name: Southern Division, Naval Facilities Engineering Command

Address: 2155 Eagle Drive, North Charleston, South Carolina, 29406

Telephone Number: 843-820-7307

B. Property Owner Information

Name (if different from above): Same as above

Address:

Telephone Number:

C. Contractor Information

Name: Tetra Tech NUS

Address: 661 Andersen Drive, Foster Plaza 7, Pittsburgh, PA 15220

Telephone Number: 412-921-7090

D. Site Information

Address: 1545 Hobson Avenue

North Charleston, South Carolina 29405-2413

Description of Adjacent Land Use (Commercial, residential, rural, etc.) Include documentation (e.g. zoning regulations) as appropriate:

The CNC is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The site is located within the developed portion of the base.

The areas surrounding CNC are "mature urban," having long been developed with commercial, industrial and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek. While ownership has changed over time, the land adjacent to NAVBASE remains dedicated to chemical, fertilizer, oil refining, metallurgy, and lumber operations

Predicted Future Land Use (include site and adjacent area):

Site 14 is located in Zone B of the CNC. Zone B consists primarily of former officer's quarters and a golf course and contains properties identified in the *Final Environmental Impact Statement for Disposal and Reuse of the Charleston Naval Base* (Ecology & Environment, Inc., June 1995) to be used for active recreation (e.g., golf course), or a cultural park, or a waterfront park.

E. Site History

Date Release Reported to SCDHEC: May 22, 1998

Estimated Quantity of Product Released: Unknown

Cause of Release: At removal, UST Quarters S1 was in good condition with no corrosion, pitting, or holes. UST Quarters S2 was in poor condition. The metal was thin and two 3/8-inch diameter holes were found about half way down the northeast side.

UST #	Product	Date Installed	Currently in use (Yes or No)	If not in use, Date Removed
1	Fuel Oil	Unknown ⁽¹⁾	No	4/14-16/98
2	Fuel Oil	Unknown ⁽¹⁾	No	4/14-16/98

- (1) Quarters S was built in the late 1930s. UST Quarters S2 is thought to be the original fuel oil tank for the building. At an unknown date, it was abandoned and UST Quarters S1 was installed.

Other Releases at this site? Yes _____ No X

If yes, Date Release Reported to SCDHEC: Not applicable

Status of Release: Corrective action

No Further Action Date: Not applicable

SITE CHARACTERISTICS

A. Site Geography

Describe the topography of the site and surrounding area (slope, vegetation, bodies of water, major land features, etc.): Site 14, CNC is located in Charleston County, South Carolina, in the Lower South Carolina Coastal Plain Physiographic Province on the Cooper River side of the Charleston Peninsula. The peninsula is formed by the confluence of the Cooper and Ashley Rivers. Topography in the area is typical of the South Carolina lower coastal plain and is characterized by having low-relief plains broken by meandering streams and rivers flowing toward the coast, past occasional marine terrace escarpments (E/A&H, 1996).

Site 14 is located in Zone B of the CNC. The site and adjacent areas have long been developed. Land use in Zone B consisted of officer's quarters and a golf course and vegetation is consistent with that use. Noisette Creek is located approximately 972 feet north of the former UST locations. The Cooper River flows approximately 1,800 feet to the west of the site.

Mean Elevation of Site: 7.96 ft above MSL

Additional Comments: None

Exposure Analysis

Describe all potential receptors and preferential pathways within a 1000-foot radius of the site.

Description of Receptor	Distance/Direction from Site
Visitor/Recreator	On-site – no complete pathway
On-site Resident	On-site – no complete pathway
Off-site Resident	Nearest building ~50 feet south-southeast – no complete pathway
Construction Worker	On-site – working in soils or groundwater
Commercial Worker	On-site – no complete pathway
Surface Water	UST S2 to Noisette Creek - ~972 feet – no complete pathway

Provide any additional comments necessary to complete the exposure analysis:

Visitor/Recreator –

This property is expected to be a recreational area (golf course and park); therefore, a visitor/recreator was considered as a potential receptor. There is no groundwater impact above RBSLs at the site so no complete groundwater pathways exist. Surface soil is not impacted at the site and recreators are not expected to contact subsurface soil. It is unlikely that any additional exposure pathways will exist; therefore, no complete pathways exist for visitors/recreators.

On-site Resident –

An on-site resident is defined as any person making his or her home at the site. This site is expected to be a recreational area; however, it is possible that it is currently used to house personnel from ships being serviced at the base. Therefore, a current resident was considered as a potential receptor. There is no groundwater impact above RBSLs at the site so no complete groundwater pathways exist. Surface soil is not impacted at the site and residents are not expected to contact subsurface soil. It is unlikely that any additional exposure pathways will exist; therefore, no complete pathways exist for on-site residents.

Off-site Residents –

All pathways for off-site resident would be the same as those for an on-site resident. As no complete pathways exist for an on-site resident, this receptor was not considered further.

Construction Worker –

An on-site construction worker is defined as a laborer who would be involved in intrusive activities on or around the site, particularly in the area of subsurface utilities. On-site construction workers could be exposed to constituents in soil by the following pathways: inhalation of volatiles from soil, dermal contact with soil, and incidental ingestion of soil. On-site construction workers could be exposed to constituents in groundwater by the following pathways: inhalation of volatiles from groundwater, dermal contact with groundwater, and incidental ingestion of groundwater. There is no groundwater impact at the site; however, impacted soil leaching to groundwater was considered as a complete pathway. There are buried water, electric, and a sanitary sewer lines within close proximity of the former UST location; therefore, the point of exposure location for the on-site construction worker was considered to be at the source.

Commercial Worker –

An on-site commercial or industrial worker is defined as a business employee who works in a commercial/industrial capacity at the site. The future use of the property is expected to be recreational but may possibly be industrial or commercial; therefore, an on-site worker was considered as a potential receptor. Incidental ingestion and dermal contact with impacted soil are expected to be negligible for commercial workers because they are located inside a building. Groundwater at the site is not impacted above the RBSLs; therefore, no groundwater pathways are complete. It is unlikely that any additional exposure pathways will exist; therefore, no complete pathways exist for commercial workers.

Surface Water –

Noisette Creek is located approximately 972 feet north of the site. There is no impacted groundwater at the site to impact off-site surface water; therefore, this pathway was not considered further.

B. Utilities Survey

List the utilities on site, and adjacent to the site within a 250-foot radius, that could serve as exposure points or as preferential pathways.

Utility	On-site or Distance/Direction from site	Depth to Utility
Buried Communication Cable	~ 35 feet east of former UST S2	See note
Electric	~ at former UST S1	See note
Water	~ at former UST locations	See note
Sanitary Sewer	~ at former UST locations	See note
Storm Sewer	~ 75 feet south of UST S1	See note

Additional Comments: Specific information concerning the depth of utilities below land surface is currently unavailable. However, according to facility personnel, typically utility lines are located approximately 2 to 6 feet bls (SPORTENVDETHASN, 1999).

SPORTENVDETHASN (Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston), 1999. Personal Contact between Paul Calligan, TtNUS and Copes Wannamaker, SPORTENVDETHASN, June 17, 1999.

C. Site Geology

Provide a brief description of the regional geology and hydrogeology:

The geology of the Charleston area is typical of the southern Atlantic Coastal Plain. Cretaceous-age and younger sediments thicken seaward and are underlain by older igneous and metamorphic basement rock. Surface exposures consist of Recent or Pleistocene sands, silts, and clays of high organic content referred to as the Wando Formation (E/A&H, 1996a). Underlying the Wando Formation, increasing with age, are the Oligocene-age Cooper Group and the Eocene-age Santee Limestone. The Cooper Group is comprised of the Parkers Ferry, Ashley, and Harleyville Formations. The formation of particular importance in the Cooper Group is the Ashley Formation, which was formerly referred to as the Cooper Marl in most regional geologic literature. In more recent geologic nomenclature, the name "Cooper" has been given to a group of formations which includes the Ashley Formation, a pale-green to olive-brown, sandy phosphoric limestone or marl, which is locally muddy and/or sandy. The Ashley Formation in the vicinity of Charleston is encountered at a depth of approximately 30 to 70 feet bls. The top of the Ashley Formation has

been reported to be associated with an erosional basin and the entire Cooper Unit, including the Ashley Formation, is indicated to be approximately 300 feet thick (E/A&H, 1996).

Provide a brief description of the site geology and stratigraphy:

The unconsolidated sediments underlying Site 14 were observed during soil boring and monitoring well installation activities conducted between May 25 and June 8, 1999. One to 2 feet of loose sand and silty sand was encountered across the surface of most of the site. Grading downward to approximately 6 feet was interbedded sandy clay and clayey sand that alternated between tan to dark brown to blue-gray in color. Saturated conditions were typically observed below about 5 to 7 feet depth. Rock and shell fragments were regularly observed in the upper 4 feet. Wood chips or fragments were noted in several borings between depths of 5 to 7 feet. In the deep boring (14B08), a sulfuric odor was observed between 16 to 26 feet deep in fine-grained sand to a total depth of 30 feet. The sediments encountered are consistent with the Wando Formation that consists of Quaternary aged clay and sand units.

D. Soil Boring Data

Drilling Dates: May 25, 1999

Provide a brief justification for the location of the soil borings

SB-1	North of former UST S2
SB-2	At location of S2
SB-3	South of former S2 and location of former supply and return line
SB-4	East of former UST S1
SB-5	Location of former supply and return line for S1
SB-6	At location of S1
SB-7	South of S1
SB-8	West of S1
SB-9	East of S2
SB-10	Downgradient of S1
SB-11	Downgradient of S2

Complete the table below for each soil boring.

UST Area Borings –

Borehole SB – CNC14B01

Sampling Date – 5/25/99

Sample Depth – 2-3 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-2	0	Under asphalt and concrete: firm tan clay, sandy	Slightly moist to moist
4-5	0	Loose, medium brown sand, silty	Moist
5-6	0	Firm, dark gray clayey mottled rust colored with wood fragments	Sulfur odor
7-8	0	Loose, medium brown sand, silty	Moist to wet

Borehole SB – CNC14B02

Sampling Date – 5/25/99

Sample Depth – 2-3 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/3	Loose, medium brown sand, v. f. grain, silty	Slightly moist
1-2	0	Slightly clayey	
3-4	50/10 (with filter)/ 150 (headspace)	Tan clay, sandy	Moist to wet
4-5		Firm gray clay, sandy	Slightly moist, fuel odor
6-7	90	Loose tan, wood fragments, fuel stains	Fuel odor, moist to wet
7-8	400	Loose tan and, v. f. grain	Wet

Borehole SB – CNC14B04

Sampling Date – 5/25/99

Sample Depth – 3-4 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/0	Loose tan sand, fine grain, silty with rootlets	Slightly moist
2-3	0	Firm tan clay, sandy, silty	Slightly moist
3-4	0	Tan sand, fine grain, slightly clayey	Moist
6-7	120/140 –with filter	Firm gray clay, silty	Slightly moist
7-8		Tan wood	Wet
8-9		Tan sand, fine grain	Wet

Borehole SB – CNC14B06 Sampling Date - 5/25/99 Sample Depth - 4-5 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0	Loose medium brown silt with rootlets, with cinders	Slightly moist
2-3	0 (4-5 ft)	Sand, clayey, many shell fragments	Slightly moist to moist
6-7		Tan wood	Wet @ 6 feet
7-8	0	Tan sand, silty	Wet

Borehole SB – CNC14B07 Sampling Date - 5/25/99 Sample Depth - 3-5 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/0	Loose medium brown silt, sandy, slightly clayey	Slightly moist
2-3		Tan clay, sandy, mottled rust colored	Slightly moist
5-6	0/120/180 with filter (4-5 ft bgs)	Tan wood	Moist to wet
6-7	0 (7-8 ft bgs)	Medium brown sand, slightly clayey	Wet

Borehole SB – CNC14B08 Sampling Date - 5/26/99 Sample Depth - 3-5 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/0	Loose medium brown sand, v. f. silt, slightly clayey with rootlets	Slightly moist
2-3		Firm tan clay, sandy	Slightly moist
4-5		Firm to soft blue-gray clay, silty	Moist
5-6		Tan wood	Moist to wet
6-7	80/80 with filter	Loose tan sand, silty	Wet
12-13	35/30 with filter	Medium to dark brown sand, silty, v.f. grain	Saturated
14-15	45/45 with filter	Tan to light gray sand, f. grain, sulfur odor	Saturated
17-18	140/140 with filter	Same as above	Saturated
25-26	40/40 with filter	Same as above	Saturated
TD=30			

Borehole SB – CNC14B09 Sampling Date - 6/8/99 Sample Depth -

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1		Under asphalt: silty sand	Dry
4-5	18	Olive sandy clay	Moist
5-6		Dark brown silty sand	Saturated
8-10	70	Soupy muck with sand/gravel	Saturated
10-12		Silty sand	Saturated

Borehole SB – CNC14B10 Sampling Date - 6/8/99 Sample Depth -

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1		Under 2" overburden: dark brown silty sand	Dry
1-2		Light brown sandy clay	Dry
4-5	150 (3-4 feet)	Light brown silty sand	Moist
5-7	990 (6-7 feet)	Brown silty clay	Saturated
7-8		Light brown silty sand	Saturated
10-11		Gray silty sand with wood chips	Saturated

Piping and Dispenser Area Borings –

Borehole SB – CNC14B03 Sampling Date - 5/25/99 Sample Depth - 3-4 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/5	Loose, medium brown sand, silty, slightly clayey, rock fragments	Slightly moist
2-3	0	Firm tan clay, silty, rock fragments, sharks teeth	Slightly moist
4-5	0/60	Firm, blue-gray clay, silty	Moist
6-7	0	Tan wood	Moist to wet
7-8	0	Sand, v f. grain	Wet

Borehole SB – CNC14B05 Sampling Date - 5/25/99 Sample Depth - 3-4 feet bgs

Split Spoon Interval (ft.)	Field Screening Results (mg/kg)	Lithology (soil type, color, rocks/minerals present)	Soil Conditions (dry, moist, etc; petroleum odor)
0-1	0/0	Loose medium brown silt, slightly clayey. rootlets	Slightly moist.
2-3		Firm tan clay, silty shell fragments	Slightly moist.
3-4		Sand, silty	Moist to wet.
4-5	30/25 with filter (headspace)	Firm tan clay, silty. Slightly moist, sulfur odor	Same as above.
5-6			
6-7		Tan wood.	Wet
7-8		Medium brown sand, silty, slightly clayey	Wet

Enter the soil analytical data for each soil boring for all COC in the table below and on the following page. Enter the appropriate RBSL for the soil type from Tables 4 through 8 in SCDHEC Risk-Based Corrective Action (RBCA) for Petroleum Releases Guidance Document.

CoC	RBSL ⁽¹⁾	SB-2	SB-2D	SB-4	SB-5	SB-6
Benzene	5	<7	<6	<6	<6	<6
Toluene	1622	<7	<6	<6	<6	<6
Ethylbenzene	1260	<7	<6	<6	<6	<6
Xylenes	42,471	<7	<6	<6	<6	<6
Naphthalene	210	<7	1800	<6	<6	<6

CoC	RBSL ⁽¹⁾	SB-2	SB-2D	SB-4	SB-5	SB-6
Benzo(a)anthracene	73,084	<430	7000	<400	<430	<400
Benzo(b)fluoranthene	29,097	<430	8500	<400	<430	<400
Benzo(k)fluoranthene	231,109	<430	3500	<400	<430	<400
Chrysene	12,998	<430	6700	<400	<430	<400
Dibenzo(a,h)anthracene	87,866	<430	970	<400	<430	<400
TPH (EPA 3550) mg/kg	N/A	785	321	NA	NA	NA
TOC (background boring) mg/kg	N/A	NA	NA	NA	11,900	NA

NA = Not Available

All units in µg/kg, except as noted.

⁽¹⁾ SCDHEC Risk Based Screening Levels for sandy soils; depth to groundwater < 5 feet.

Discuss the horizontal and vertical extent of COC in the soil: Only the duplicate sample from soil boring –02, 14SLB020203D, had any detectable CoCs, with only naphthalene at a concentration above its RBSL. The original sample at soil boring –02 had no detectable CoCs. This sample was collected at 2-3 feet below ground surface. Other soil samples collected at deeper intervals but in different locations were all non-detect.

Additional Comments: None

F. Chemicals of Concern – Ground Water

Provide well installation information in the table below.

MW No.	Installation Date	Development Date	Sampling Date
MW-01	6/21/99	7/2/99	7/13/99 9/8/99
MW-02	8/25/99	8/26/99	9/8/99
MW-03	8/25/99	8/26/99	9/8/99

Enter the soil analytical data for each monitoring well for all CoC in the table below.

Not Applicable. Soil from well construction was not analyzed for CoCs.

CoC	MW-	MW-	MW-	MW-
Depth of sample				
Benzene				
Toluene	<p style="text-align: center;">Soil samples were not collected from boreholes during monitoring well installation. However, soil samples were collected from direct push soil borings located in the immediate vicinity.</p> <p style="text-align: center;">See preceding soil analytical data for direct push borings.</p>			
Ethylbenzene				
Xylenes				
Total BTEX				
Naphthalene				
Benzo(a)anthracene				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Chrysene				
Dibenz(a,h)anthracene				
Lead				
EDB				

Summarize the monitoring well and ground water data in the table below.

MW No.	Date Measured	TOC Elevation (feet)	Screened Interval (feet BTOC)	Depth to Water (feet)	Water Table Elevation (ft)
MW-01	7/13/99	7.79	4-14	4.67	3.12
MW-01	9/8/99	7.79	4-14	4.71	3.08
MW-02	9/8/99	8.20	3-13	5.15	3.05
MW-03	9/8/99	7.24	4-14	4.20	3.04

Enter field data measurements (temperature, pH, conductivity) taken during well purging on the form provided. Complete for each well.

Monitoring Well No.	Date Measured	Dissolved Oxygen (mg/l)
MW-01	7/13/99	2.86
MW-01	9/8/99	2.39
MW-02	9/8/99	0.73
MW-03	9/8/99	1.27

Enter the ground water analytical data for each monitoring well for all CoC in the table below.
If free product is present, indicate the measured thickness to the nearest 0.01 feet.

CoC	RBSL (ug/l)	MW-01	MW-01	MW-02	MW-03
Date Sampled		July 13, 1999	Sept. 8, 1999	Sept. 8, 1999	Sept. 8, 1999
Free Product Thickness	None	0.00	0.00	0.00	0.00
Benzene	5	<5	<5	<5	<5
Toluene	1,000	<5	<5	<5	<5
Ethylbenzene	700	<5	<5	<5	<5
Xylenes	10,000	<5	<5	<5	<5
Total BTEX	N/A	–	–	–	–
EDB	5	<5	<5	<5	<5
MTBE	40	<5	<5	<5	<5
Naphthalene	25	<5	<5	<5	<5
Benzo(a)anthracene	10	<10	<10	<10	<10
Benzo(b)fluoranthene	10	<10	<10	<10	<10
Benzo(k)fluoranthene	10	<10	<10	<10	<10
Chrysene	10	<10	<10	<10	<10
Dibenzo(a,h)anthracene	10	<10	<10	<10	<10
Ferrous Iron	N/A	NA	3.04 mg/L	3.3 mg/L Limit	3.30 mg/L Limit
Lead	Site Specific	NA	NA	NA	NA
Nitrates (mg/L)	N/A	NA	<0.050	<0.050	0.072
Sulfates (mg/L)	N/A	NA	2.0	2.7	560

NA = Not Analyzed

All units µg/L except as noted.

Additional Comments: None

G. Aquifer Characteristics

Hydraulic Conductivity: 2.90 ft/day – average of three shallow well slug tests in Zone B RFI

Hydraulic Gradient: 0.00458 ft/ft

Porosity: Zone B - 43% (Zone B RFI Report) / site-specific – 47% (default for sandy soil – sieve analysis indicated 90 percent sand; porosity = 0.45)

Estimated Seepage Velocity: 0.028 feet/day

II. Tier I Evaluation

Performance of a Site Conceptual Model is required because the RBSLs for soil leaching were exceeded. Groundwater RBSLs were not exceeded. Only one CoC concentration in soil exceeded the RBSLs for sandy soil at a depth to groundwater of <5 ft. The duplicate sample from soil boring SB-02 (Sample No. SB-02D) at 2 to 3 feet below land surface contained naphthalene at a concentration of 1,800 µg/kg. Exceeding the soil RBSL for naphthalene requires performance of a Site Conceptual Model (identification of current and future potential receptors and human exposure pathways) as shown below.

A. CURRENT LAND USE – Identify any potential receptors or human exposure pathways (e.g. basements, contaminated soils from UST closures, etc.) within a 1000-foot radius for current land use.

Media (for exposure)	Exposure Route	Pathway Selected for Evaluation?	Exposure point or Reason for Non-Selection	Data Requirements (IF pathway selected)
Air	Inhalation	No	All volatiles measured at non-detects.	
	Explosion Hazard	No		
Ground-Water	Ingestion	No	There were no groundwater concentrations of CoCs above detection.	
	Dermal Contact	No		
	Volatile Inhalation	No		
Surface Water	Ingestion	No	There were no groundwater concentrations of CoCs above detection.	
	Dermal Contact	No		
	Volatile Inhalation	No		
Surficial Soil	Ingestion	No	No surface soil is impacted.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No		
Subsurface Soil	Ingestion	No	No current complete pathways.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No		

B. FUTURE LAND USE – identify any potential receptors of human exposure pathways (e.g. basements, contaminated soils from UST closures, etc.) within a 1000-foot radius for projected future land use.

Media (for exposure)	Exposure Route	Pathway Selected for Evaluation?	Exposure point or Reason for Non-Selection	Data Requirements (IF pathway selected)
Air	Inhalation	No	All volatiles measured at non-detects.	
	Explosion Hazard	No		
Ground- Water	Ingestion	No	There were no groundwater concentrations of CoCs above detection.	
	Dermal Contact	No		
	Volatile Inhalation	No		
Surface Water	Ingestion	No	There were no groundwater concentrations of CoCs above detection.	
	Dermal Contact	No		
	Volatile Inhalation	No		
Surficial Soil	Ingestion	No	No surface soil is impacted.	
	Dermal Contact	No		
	Volatile Inhalation	No		
	Leaching to Groundwater	No		
Subsurface Soil	Ingestion	Yes	Construction workers in utility trench. No volatile organics are present in the soil above RBSLs.	No additional data needed.
	Dermal Contact	Yes		
	Volatile Inhalation	No		
	Leaching to Groundwater	Yes		

Recommendations for further action:

The Site Conceptual Model identified one possible receptor with two pathways;

- 1). A construction worker in a utility trench ingesting and having dermal contact with impacted subsurface soil.
- 2). A construction worker in a utility trench who might ingest and have dermal contact with groundwater contaminated by the leaching of petroleum hydrocarbons from the soil to the groundwater.

Based on the identification of possible receptors, a Tier 2 evaluation was performed and is presented in the next section.

III. Tier 2 Evaluation

A Tier 2 evaluation is necessary for determining the potential risk to a construction worker in a utility trench exposed to naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, or dibenzo(a,h)anthracene in soil or groundwater that has leached from impacted soil. The following analyzes two scenarios for a construction worker being exposed to the potential risk.

RBSLs FOR CONSTRUCTION WORKER EXPOSURE

Ingestion and Dermal Contact with Soil for a Construction Worker in a Utility Trench

The only identified potential receptor is the construction worker. For ingestion and dermal contact with soil while working in a utility trench, subsurface soil exposure to a construction worker is similar to surface soil exposure. The RBSLs given by SCDHEC for ingestion and dermal contact with surficial soils by a commercial worker are compared to the site soil concentrations in the table below. (RBSLs for commercial workers are conservative for construction workers. See note ⁽¹⁾ below.)

CoC	RBSL	SB-2	SB-2D	SB-4	SB-5	SB-6
Benzene	200	<0.007	<0.006	<0.006	<0.006	<0.006
Toluene	410,000	<0.007	<0.006	<0.006	<0.006	<0.006
Ethylbenzene	200,000	<0.007	<0.006	<0.006	<0.006	<0.006
Xylenes	1,000,000	<0.007	<0.006	<0.006	<0.006	<0.006
Naphthalene	41,000	<0.007	1.8	<0.006	<0.006	<0.006
Benzo(a)anthracene	3.9	<0.430	7.0	<0.400	<0.430	<0.400
Benzo(b)fluoranthene	3.9	<0.430	8.5	<0.400	<0.430	<0.400
Benzo(k)fluoranthene	39	<0.430	3.5	<0.400	<0.430	<0.400
Chrysene	390	<0.430	6.7	<0.400	<0.430	<0.400
Dibenzo(a,h)anthracene	0.39	<0.430	0.970	<0.400	<0.430	<0.400

Note: All concentrations in mg/kg

⁽¹⁾ A commercial worker has a typically assumed exposure duration (ED) of 25 years and an exposure frequency (EF) of 250 days/year. A construction worker would be expected to have a much lower exposure duration and exposure frequency based on the nature of utility or construction work. The exposure frequency can be assumed to be 90 days/year and the exposure duration can be assumed to be 1 year. These assumptions are based on the nature of utility work. **Therefore, the RBSLs for construction workers are expected to be higher than those for commercial workers.**

Soil concentrations in soil boring SB02D (duplicate sample) for benzo(a)anthracene, benzo(b) fluoranthene, and dibenzo(a,h)anthracene exceeded the RBSLs for ingesting or contacting the impacted soil. Therefore, a construction worker contacting or accidentally ingesting soil while working below grade on the sanitary sewer adjacent SB02 (area of former UST Quarters S2) could be considered at risk.

The concentrations for benzo(a)anthracene, benzo(b) fluoranthene, and dibenzo(a,h)anthracene exceed the Commercial RBSL for ingestion or dermal contact with surficial soil. However, the RBSLs provided in the RBCA Guidance assume that a commercial worker will have an exposure duration for 25 years having an exposure frequency of 250 days per year. A construction worker would be expected to have a much lower exposure duration and exposure frequency based on the nature of utility, construction, or remediation work. The exposure frequency can be assumed to be 90 days/year or less and the exposure duration can be assumed to be one year or less. These assumptions are based on the nature of typical utility-type work. Furthermore, the maximum source concentration of benzo(a)anthracene, benzo(b) fluoranthene, and dibenzo(a,h)anthracene detected in soil only slightly exceeds the RBSLs. Therefore, benzo(a)anthracene, benzo(b) fluoranthene, and dibenzo(a,h)anthracene is no longer considered a threat to a construction worker in a utility trench and is not considered for further analysis.

Ingestion of and Dermal Contact with Groundwater and Inhalation of Vapors (Impacted by Soil Leaching) for a Construction Worker in a Utility Trench

An additional pathway considered complete for construction workers was that of leaching to groundwater. The potential construction worker's exposure to groundwater was assumed to consist of three pathways: dermal contact, incidental ingestion, and inhalation of volatiles. Drinking water is provided by the city; therefore, ingestion of groundwater is not a complete pathway.

1) Calculation of RBSLs

Groundwater RBSLs provided by SCDHEC are for ingestion only; therefore, RBSLs were calculated for the additional pathways.

Groundwater RBSLs for the construction worker were calculated for three pathways: dermal contact, incidental ingestion, and inhalation of volatiles. A target cancer risk of 1×10^{-6} and a target hazard quotient of 1 were used in the calculations. Standard defaults were used when available and applicable to a construction worker. When no standard parameters were available, conservative assumptions were used. Where possible, site-specific parameters were used for site conditions. For all pathways, the exposure frequency was assumed to be 90 days/year and the exposure duration was assumed to be 1 year. These assumptions were considered conservative based on the nature of utility work.

The dermal contact RBSLs were calculated using procedures given in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment, Interim Guidance* (EPA Peer Consultation Workshop Draft 1998). Based on expected limited contact with groundwater, the event frequency was assumed to be one event/day and the event duration was assumed to be one hour/event. The skin surface area available for contact was 4500 cm^2 , based on one-fourth the skin surface area given in the risk assessment guidance document for a swimming adult.

The incidental ingestion RBSLs were calculated using the equation given in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Interim Final)*, EPA/540/1-89/002 (EPA 1989). An incidental ingestion rate of 0.01 L/day was assumed based on a fraction (12.5%) of the incidental ingestion rate for a wading adult (0.01 L/hr), considered for an 8-hour work day. The incidental ingestion rate for wading adults is given in *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment* (EPA Region 4 1995).

The inhalation RBSLs were calculated using equations given in the American Society for Testing and Materials (ASTM) *Standard Guide for Risk-Based Corrective Action Applied to Petroleum Release Sites, Designation E 1739-95E1* (1997). Site-specific values for total soil porosity and depth to groundwater were used. Other parameters were ASTM defaults.

The minimum RBSL for the three pathways was chosen as the RBSL for the construction worker. The following tables show the calculated RBSLs for each pathway along with the selected (minimum) RBSL:

	Dermal RBSL	Incidental Ingestion RBSL	Inhalation RBSL	Selected (Minimum)
	mg/L	mg/L	mg/L	mg/L
Naphthalene	1.63	113.56	2.63	1.63

2) Calculation of SSTL for Naphthalene Leaching from Soil to Groundwater

The naphthalene concentration from soil boring B02 duplicate (1.8 mg/kg) exceeded the soil-leaching RBSL for sandy soil of 0.210 mg/kg. The SCDHEC Soil Leachability Model was used to calculate a site-specific target level (SSTL) for naphthalene. Site-specific parameters were input when available, else SCDHEC defaults for sandy soil were used. The minimum calculated groundwater RBSL for construction worker exposure (1.63 mg/L)(see above table) was used as opposed to the groundwater RBSL for ingestion (0.01 mg/L). The soil leaching SSTL calculated for naphthalene was 250 mg/kg, which is greater than the maximum naphthalene concentration of 1.8 mg/kg found in the soil during the site assessment.

CoC	Concentration in SB02-duplicate (mg/kg)	Soil Leaching SSTL (mg/kg)
Naphthalene	1.8	250

Therefore, since the maximum soil concentration of naphthalene (1.8 mg/kg) found during the site assessment does not exceed the calculated SSTL for naphthalene (250 mg/kg), the construction worker is not at risk if exposed to groundwater by dermal contact, incidental ingestion, or inhalation. The concentration of naphthalene in the groundwater resulting from naphthalene leaching from the soil to the groundwater will not exceed the RBSL for a construction worker in a utility trench (1.63 mg/L) regardless of distance from the source. This potential receptor is considered nonthreatened and further analysis is unnecessary.

Recommendations for Further Action:

Preparation of an Intrinsic Corrective Action Plan is recommended.

FIGURES

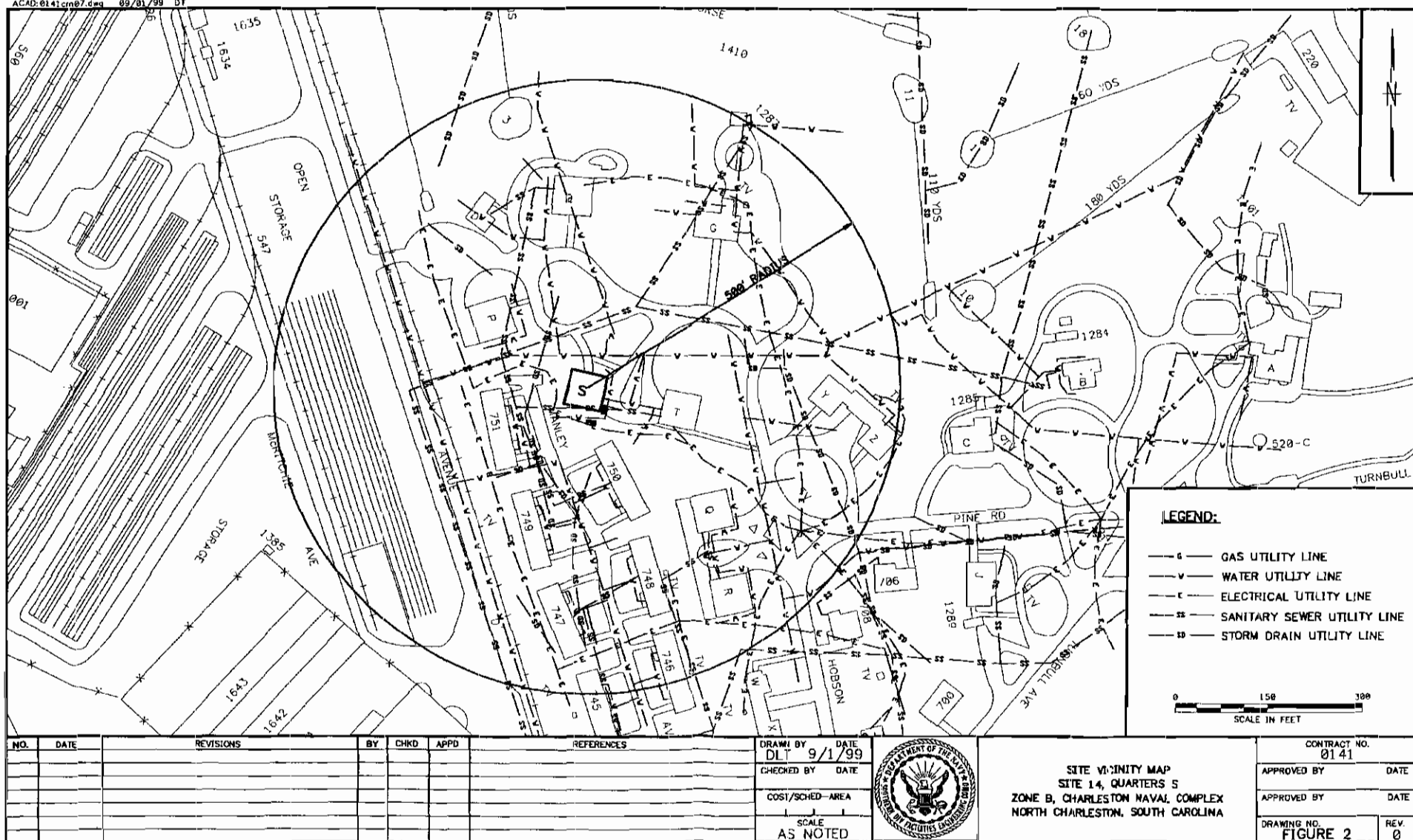
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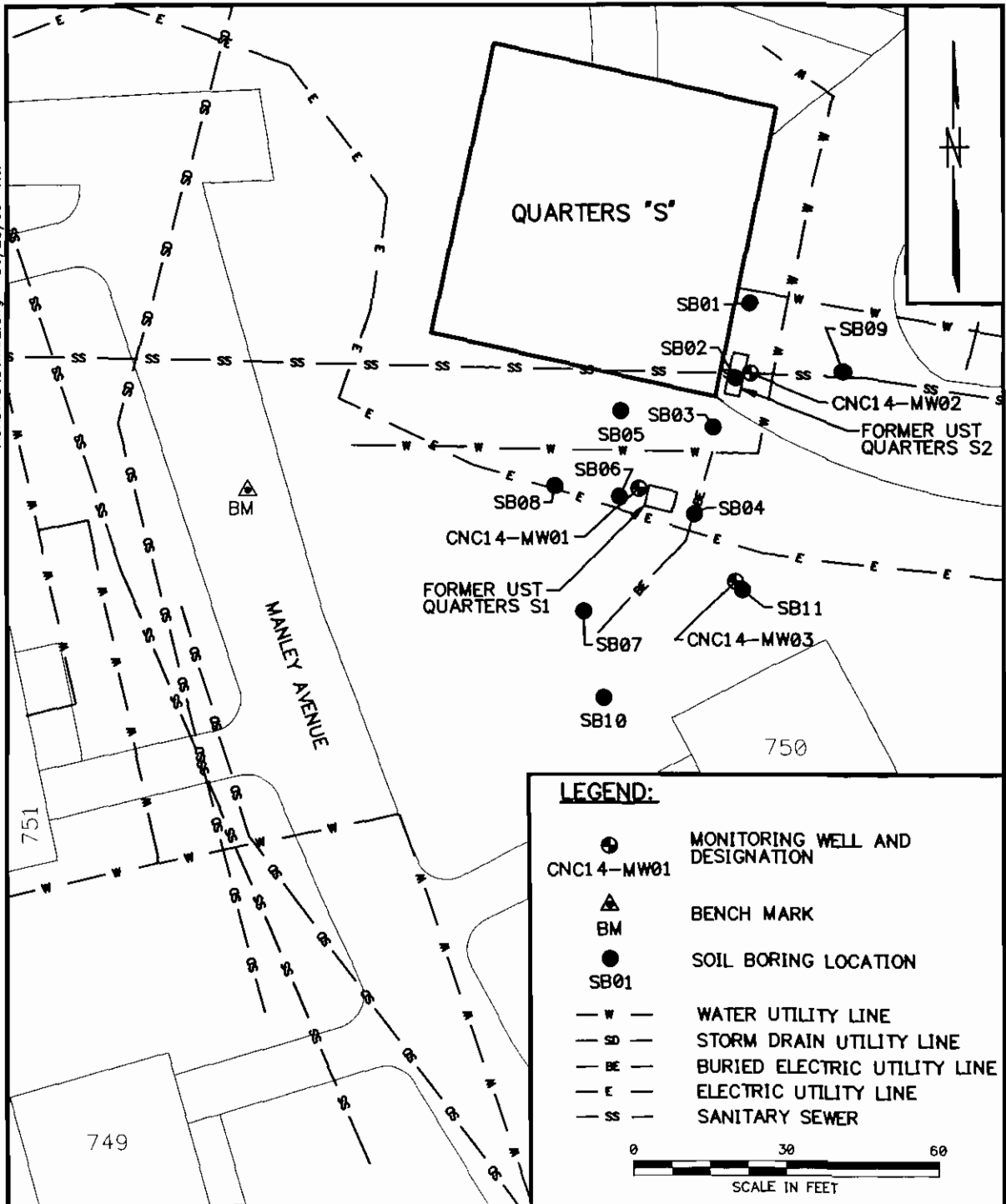
SOURCE: QUADRANGLE MAP SOUTH CAROLINA, REVISED 1979
QUADRANGLE MAP NORTH CHARLESTON, REVISED, 1979











DRAWN BY HJP CHECKED BY COST/SCHED-AREA SCALE AS NOTED	DATE 8/20/99 DATE DATE DATE		SITE LOCATION MAP SITE 14, BUILDING S1 & S2, ZONE B CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SC	CONTRACT NO. N0141 APPROVED BY APPROVED BY DRAWING NO. FIGURE 1	DATE DATE REV. 0
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ACAD:0141cm12.dwg 10/26/99 HJP



LEGEND:

-  MONITORING WELL AND DESIGNATION
CNC14-MW01
-  BENCH MARK
BM
-  SOIL BORING LOCATION
SB01
-  WATER UTILITY LINE
-  STORM DRAIN UTILITY LINE
-  BURIED ELECTRIC UTILITY LINE
-  ELECTRIC UTILITY LINE
-  SANITARY SEWER

0 30 60
SCALE IN FEET

DRAWN BY DATE
NS 10/7/99

CHECKED BY DATE

COST/SCHED-AREA

SCALE
AS NOTED



SITE MAP
SITE 14, QUARTERS "S"
ZONE B, CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

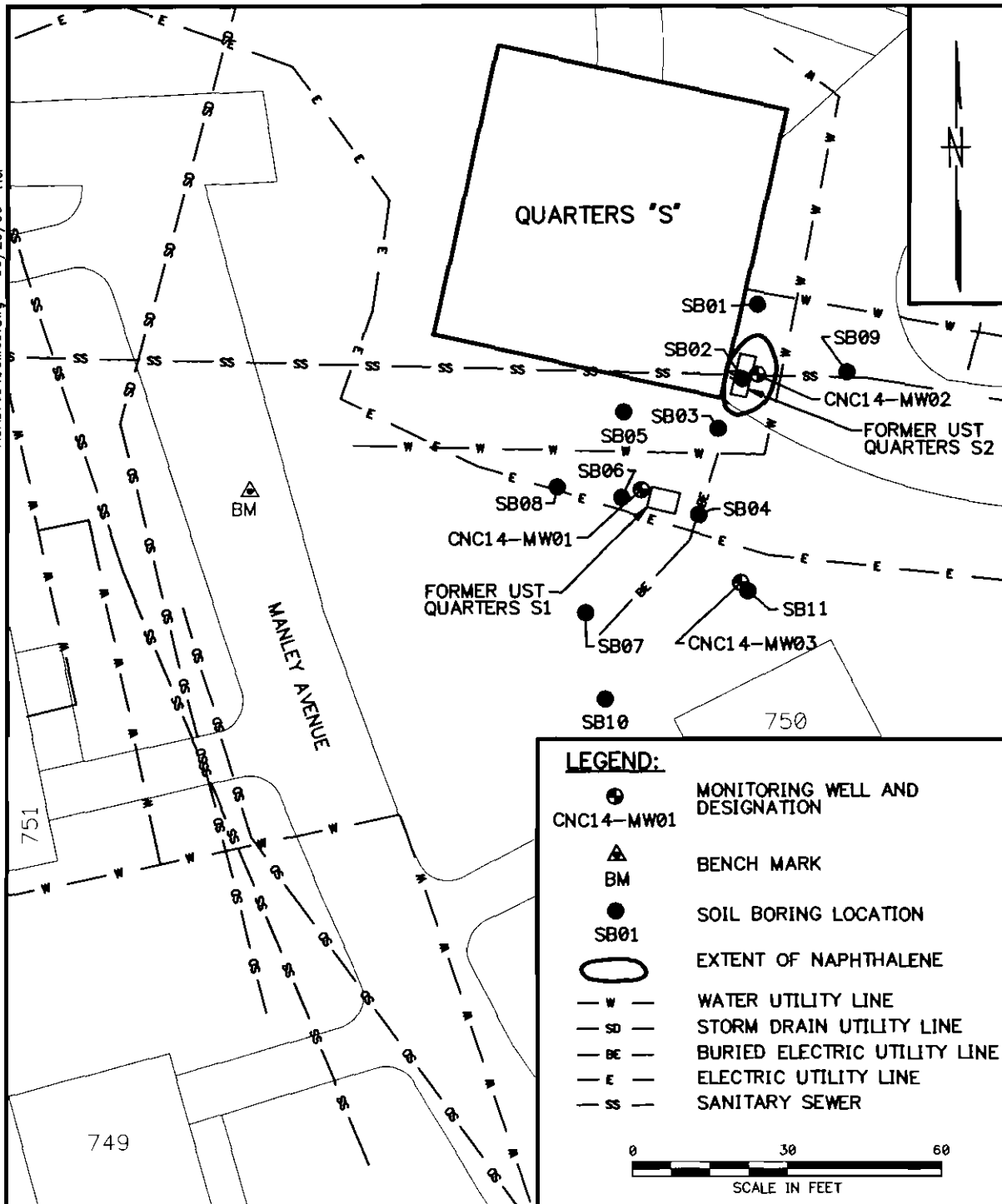
CONTRACT NO.
0141

APPROVED BY DATE

APPROVED BY DATE

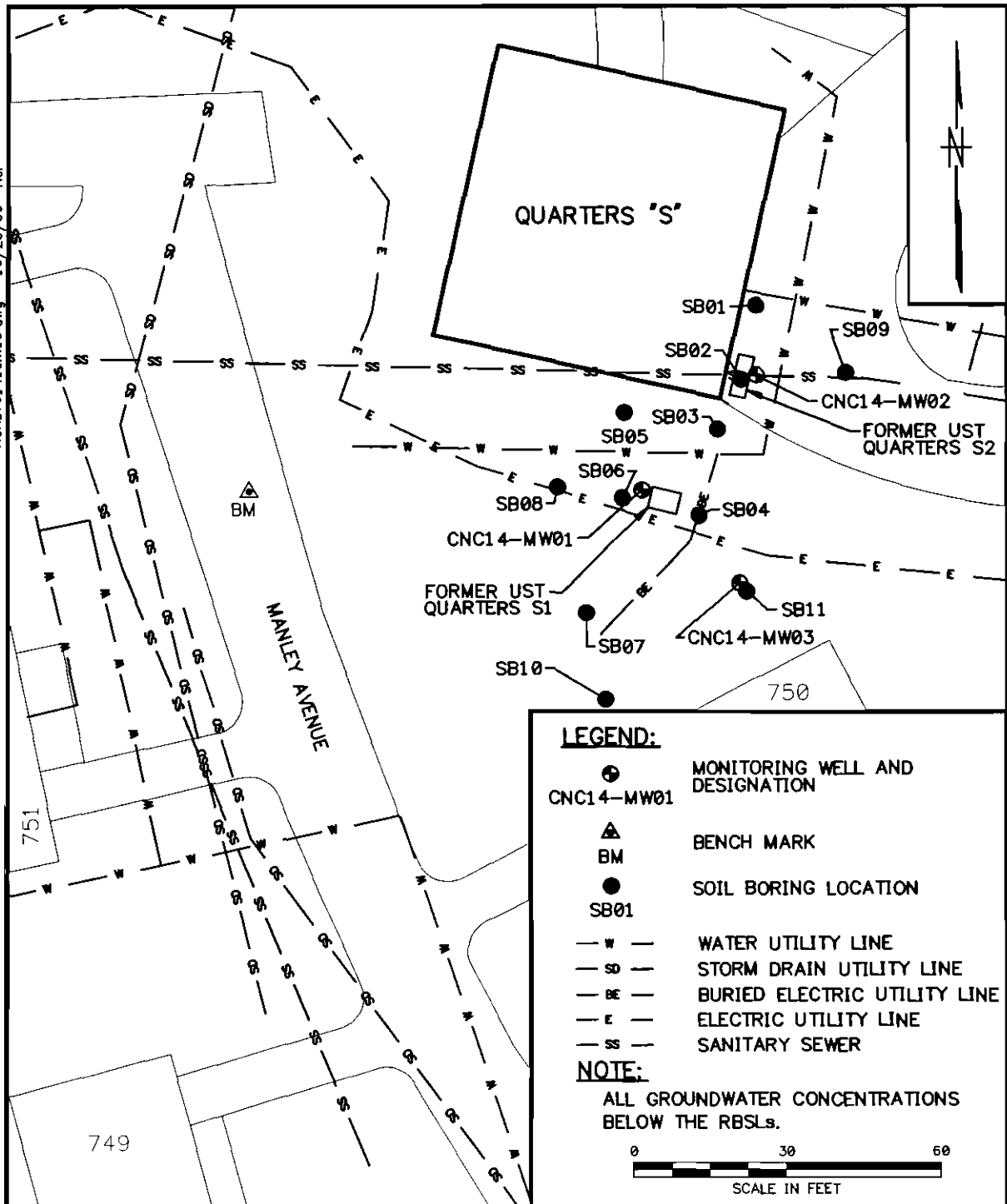
DRAWING NO. REV.
FIGURE 3 0

ACAD:0141GM01.dwg 10/26/99 HJP



DRAWN BY NS	DATE 10/7/99		SOIL COC SITE MAP SITE 14, QUARTERS 'S' ZONE B, CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA		CONTRACT NO. 0141	
CHECKED BY	DATE		APPROVED BY	DATE	APPROVED BY	DATE
COST/SCHED-AREA						
SCALE AS NOTED			DRAWING NO. FIGURE 4	REV. 0		

ACAD:0141cm15.dwg 10/26/99 HJP

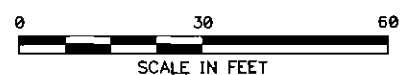



LEGEND:

- CNC14-MW01 MONITORING WELL AND DESIGNATION
- ▲ BM BENCH MARK
- SB01 SOIL BORING LOCATION
- W — WATER UTILITY LINE
- SD — STORM DRAIN UTILITY LINE
- BE — BURIED ELECTRIC UTILITY LINE
- E — ELECTRIC UTILITY LINE
- SS — SANITARY SEWER

NOTE:

ALL GROUNDWATER CONCENTRATIONS BELOW THE RBSLs.



DRAWN BY NS 10/7/99	DATE 10/7/99		CONTRACT NO. 0141	
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5	REV. 0

APPENDIX A
SOIL BORING LOGS

BORING LOG

Page 1 of 1

PROJECT NAME: Site 14
 PROJECT NUMBER: _____
 DRILLING COMPANY: Columbia
 DRILLING RIG: Strataprobe

BORING NUMBER: CNC14B01
 DATE: 5/25/99
 GEOLOGIST: BDH
 DRILLER: RB

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
5-1 @ 1212			1.8' / 4.0'	1'	firm	tan	asphalt @ sfc for 1-3' concrete for 1-1' clay, sandy		2 moist to wet 145FB010203				0
	4			3.5'									
				4.2'	loose	tan	sand, silty, cl.		moist				
5-2 @ 1215			2.5' / 4.0'	5.1'	firm	gray	clayey, mottled dark gray, rust colored, w/ wood frags.		sulfur odor	990		100 w/ filter	
	8				loose	tan	sand, silty		moist to wet	0			
							TO 8'						

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read

Remarks: _____

Drilling Area
 Background (ppm):

Converted to Well: Yes ☐ No ☐ Well I.D. #: _____

BORING LOG

Page 1 of 1

PROJECT NAME: Site 14 BORING NUMBER: CNC14B02
 PROJECT NUMBER: _____ DATE: 5/25/99
 DRILLING COMPANY: Columbia GEOLOGIST: BDH
 DRILLING RIG: Stratagable DRILLER: RB

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
5-1 1410	4	2.8 1/4	1.8'	1.8'	loose med	tan	Sand, v. fine, silty, sl. moist			0			0
							sl. clayey			145FB020203	0		
							in clay, sandy			moist to wet @ ~3.4', sl.	50	not filled	
5-2 1415	8	2.1 1/4	7.15'	7.15'	fine med	gray	clay, sandy sl. moist			fuel odor	10	150	not filled
					loose tan		wood fragments, fuel stains			fuel odor, moist	90		
					loose tan		Sand, v. fine			to wet	400		

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole Increase reading frequency if elevated response read

Remarks: _____

Drilling Area
Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

Page 1 of 1

PROJECT NAME: Site 14

BORING NUMBER: CNC 14 B03

PROJECT NUMBER:

DATE: 5/25/99

DRILLING COMPANY: Columbia

GEOLOGIST: BDH

DRILLING RIG: Drillprobe

DRILLER: RB

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
5-1 1484	4	33/4	1.4'		Loose	mod fm	Sand, silty, sl. clayey some, w/ frags		sl. moist	0/5			
					fine	tan	clay, silty, w/ frags		sl. moist	0			
					fine	blue gray	clay, silty		moist	0/60			
5-2 1490	8	1.6/4	7.5'	7'	tan		Wood		moist to wet	0			
							Sand, v. grad		moist	0			
							TD 8'						

When rock conng, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area

Background (ppm):

Converted to Well: Yes

No

Well I.D. #:

Page 1 of 1

BORING NUMBER: CNC14BDH
DATE: 5/25/99
GEOLOGIST: BDH
DRILLER: RB

[illegible]

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read

Drilling Area
Background (ppm):

Converted to Well:	Yes	No	Well I.D. #:
--------------------	-----	----	--------------

Page 1 of 1

BORING NUMBER: CNC 14 B05

DATE: 5/25/99

GEOLOGIST: BDH

DRILLER: 88

✓When rock conng, enter rock brokeness

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks:

Drilling Area

Background (ppm):

Converted to Well: Yes

No

Well I.D. #:

Page 1 of 1

BORING NUMBER: CNC14B06

DATE: 5/25/99

GEOLOGIST: BDH

DRILLER: R B

5-2
Q
164

Well I.D. #:

Page 1 of 1

Site 14

CNC 14 B07

DATE:

5/26/99

Columbia

GEOLOGIST:

B D H

Shutay roko

DRILLER:

RE

5-2
①
0911

Well I.D. #:

BORING LOG

Page 1 of 2

PROJECT NAME: Site 14

BORING NUMBER: CNC14B08

PROJECT NUMBER: _____

DATE: 5/26/99

DRILLING COMPANY: Columbia

GEOLOGIST: BDH

DRILLING RIG: Stratapole

DRILLER: RB

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 @ 0940	4	/	3.5/4'	1.4'	loose	brn	Sand, v. f. silty, s. clayey, w/ roots		sl. moist	90			0
				3.5'	fin	tan	clay, sandy		sl. moist				
				5.5'	fin	brn	clay, silty		moist				
S-2 @ 0943	8	/	0/4'	6.0'	loose	tan	Wood		moist to wet				
					loose	tan	Sand, silty		wet	80/80			w/ filter
S-3	12	/	0/4'		NO Recovery 8'-12'								
S-4	16	/	4/4'	13.5'	mod	brn	Sand, silty, v. f. grnd		saturated	35/30			0
					tan		Sand, f. grnd, sulfur odor		saturated	45/35			w/ filter
S-5	20	/	4/4'		to	gray				10			
S-6	24	/	4/4'							140/100			w/ filter

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area

Background (ppm): _____

Converted to Well: _____

Yes _____

No _____

Well I.D. #: _____

Page 2 of 2

BORING NUMBER: CNC14 B08

DATE: 5/26/99

GEOLOGIST: BPH

DRILLER: AB

Converted to Well:	Yes	No	Well I.D. #:
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Page 1 of 1

BORING NUMBER: 14B09

DATE: 6/8/99

GEOLOGIST:

DRILLER: V. Brand

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 5" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/Consistency or Rock Hardness	Color Material Classification			Sample	Sampler BZ	Barhole	Driller BZ
	1	/			Gravel	Asphalt / Silty Sand	60 60	Dry				
	2	/										
	3	/										
	4	/	1/4									
	5	/										
	6	/			Olive	Sandy Clay		Moist	18	0	0	0
	7	/			BL Brown	Silty Sand		Saturated				
	8	/	2 3/4									
	9	/			Blk.	Soggy muck w/ sand			70	0	0	0
	10	/										
	11	/			Light Brown	Silty Sand						
	12	/	4/4									

* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

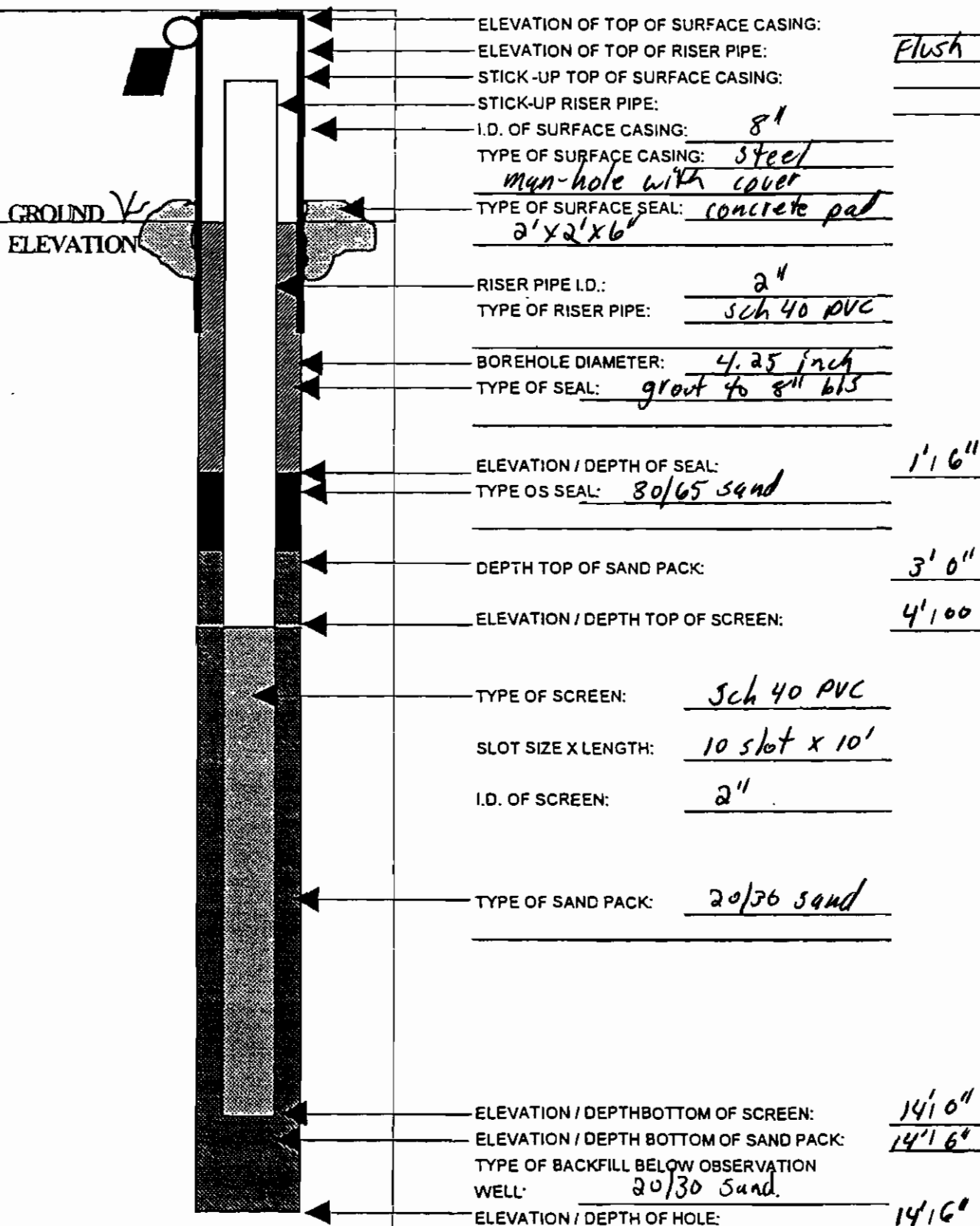
Drilling Area
Background (ppm):

Converted to Well: Yes Twp/ No
Pier. meter

APPENDIX B
MONITORING WELL CONSTRUCTION LOGS

OVERBURDEN MONITORING WELL SHEET

PROJECT	<u>CNC</u>	LOCATION:	<u>CNC14-MW01</u>	DRILLER	<u>Rod</u>
PROJECT NO.	<u>CNC14</u>	BORING	<u>CNC14-MW01</u>	METHOD:	<u>BPT</u>
ELEVATION		DATE	<u>6/21/99</u>	DRILLING	<u>HSA</u>
FIELD GEOLOGIST	<u>Marty Ray</u>			DEVELOPMENT:	<u>NA</u>



CNC 14-
BORING NO.: MW02

OVERBURDEN MONITORING WELL SHEET

PROJECT <u>CNC</u>	LOCATION: <u>Site 14</u>	DRILLER <u>R Fuller</u>
PROJECT NO. _____	BORING <u>MW-2</u>	METHOD: <u>DPT</u>
ELEVATION _____	DATE <u>8/28/99</u>	DRILLING <u>HSA</u>
FIELD GEOLOGIST <u>J. Hofer</u>		DEVELOPMENT: <u>NA</u>

	ELEVATION OF TOP OF SURFACE CASING:	<u>NA</u>
	ELEVATION OF TOP OF RISER PIPE:	
	STICK-UP TOP OF SURFACE CASING:	<u>NA</u>
	STICK-UP RISER PIPE:	
	I.D. OF SURFACE CASING:	<u>6"</u>
	TYPE OF SURFACE CASING:	<u>flush mount</u>
	TYPE OF SURFACE SEAL:	<u>concrete</u>
	RISER PIPE I.D.:	<u>2"</u>
	TYPE OF RISER PIPE:	<u>PVC</u>
	BOREHOLE DIAMETER:	<u>6"</u>
	TYPE OF SEAL:	<u>cement</u>
	ELEVATION / DEPTH OF SEAL:	<u>12</u>
	TYPE OS SEAL:	<u>fine sand</u>
	DEPTH TOP OF SAND PACK:	<u>3</u>
	ELEVATION / DEPTH TOP OF SCREEN:	<u>14</u>
TYPE OF SCREEN:	<u>PVC</u>	
SLOT SIZE X LENGTH:	<u>0.01 x 10 ft</u>	
I.D. OF SCREEN:	<u>2"</u>	
TYPE OF SAND PACK:	<u>20/30</u>	
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>119.0</u>	
ELEVATION / DEPTH BOTTOM OF SAND PACK:	<u>114.5</u>	
TYPE OF BACKFILL BELOW OBSERVATION WELL:	<u>NA</u>	
ELEVATION / DEPTH OF HOLE:	<u>114.5</u>	

OVERBURDEN MONITORING WELL SHEET

PROJECT <u>CUC</u>	LOCATION: <u>Site 14</u>	DRILLER <u>R Fuller</u>
PROJECT NO. _____	BORING <u>MW3</u>	METHOD <u>RT</u>
ELEVATION _____	DATE <u>8/25/99</u>	DRILLING <u>HSA</u>
FIELD GEOLOGIST <u>J. Hofer</u>		DEVELOPMENT: <u>NA</u>

	ELEVATION OF TOP OF SURFACE CASING:	<u>NA</u>
	ELEVATION OF TOP OF RISER PIPE:	
	STICK-UP TOP OF SURFACE CASING:	<u>NA</u>
	STICK-UP RISER PIPE:	
	I.D. OF SURFACE CASING:	<u>6"</u>
	TYPE OF SURFACE CASING:	<u>flush mount</u>
	TYPE OF SURFACE SEAL:	<u>concrete</u>
	RISER PIPE I.D.:	<u>2"</u>
	TYPE OF RISER PIPE:	<u>PVC</u>
	BOREHOLE DIAMETER:	<u>6"</u>
	TYPE OF SEAL:	<u>Cement</u>
	ELEVATION / DEPTH OF SEAL:	<u>11.5</u>
	TYPE OF SEAL:	<u>fine sand</u>
	DEPTH TOP OF SAND PACK:	<u>2.5</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>13.5</u>	
TYPE OF SCREEN:	<u>PVC</u>	
SLOT SIZE X LENGTH:	<u>0.01 x 10ft</u>	
I.D. OF SCREEN:	<u>2"</u>	
TYPE OF SAND PACK:	<u>20/30</u>	
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>113.5</u>	
ELEVATION / DEPTH BOTTOM OF SAND PACK:	<u>114.0</u>	
TYPE OF BACKFILL BELOW OBSERVATION WELL:	<u>NA</u>	
ELEVATION / DEPTH OF HOLE:	<u>114.0</u>	

APPENDIX C
FIELD SAMPLING LOGS AND
LABORATORY DATA

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>zone B</u> Project No.: _____ <input type="checkbox"/> Surface Soil <input checked="" type="checkbox"/> Subsurface Soil <input type="checkbox"/> Sediment <input type="checkbox"/> Other: _____ <input type="checkbox"/> QA Sample Type: _____	Sample ID No.: <u>14SLB020203</u> Sample Location: <u>B#3</u> Sampled By: <u>RE/JA</u> C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

GRAB SAMPLE DATA:

Date: <u>6 2 99</u>	Depth: <u>2-3'</u>	Color: <u>dk hr.</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>clayey sand</u>
Time: <u>1450</u>			
Method: _____			
Monitor Reading (ppm): _____			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>BTEX/FDB</u>	<u>4 encores</u>		
<u>DUP</u>	<u>4 encores</u>		
<u>PAH</u>	<u>1 402</u>		
<u>DUP</u>	<u>1 402</u>		
<u>TPH</u>	<u>1 402</u>		
<u>DUP</u>	<u>1 403</u>		

OBSERVATIONS / NOTES: <div style="text-align: center; font-size: 1.2em; margin-top: 20px;">Duplicate taken</div>	MAP:
Circle if Applicable: <div style="display: flex; justify-content: space-between;"> <div style="width: 15%;">MS/MSD</div> <div style="width: 35%;">Duplicate ID No.: <u>14SLB020203D 1455</u></div> </div>	Signature(s): <div style="text-align: center; font-size: 1.5em; margin-top: 10px;">M. L. L. L.</div>

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>Zone B</u>	Sample ID No.: <u>14SLB040304</u>
Project No.: _____	Sample Location: <u>B04</u>
<input type="checkbox"/> Surface Soil	Sampled By: <u>RF</u>
<input checked="" type="checkbox"/> Subsurface Soil	C.O.C. No.: _____
<input type="checkbox"/> Sediment	Type of Sample:
<input type="checkbox"/> Other: _____	<input type="checkbox"/> Low Concentration
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> High Concentration

GRAB SAMPLE DATA:

Date: <u>6 2 99</u>	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1505</u>	<u>3-4' br.</u>	<u>br.</u>	<u>Silty sand</u>
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>PAH</u>	<u>1 4 oz</u>		
<u>BTEX EDR</u>	<u>4 canisters</u>		
<u>Grain Size</u>	<u>1 32 oz</u>		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.: _____

[Signature]

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: Zone B
 Project No.: _____
☐ Surface Soil
☒ Subsurface Soil
☐ Sediment
☐ Other: _____
☐ QA Sample Type: _____

Sample ID No.: 1452 B 56394
 Sample Location: 10000 14B05
 Sampled By: J. Franklin
 C.O.C. No.: _____
 Type of Sample:
☐ Low Concentration
☐ High Concentration

FIELD SAMPLE DATA

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
6/2/97			
Time: 1525			
Method:	3-4' bgs	Brown	Clayey Sand
Monitor Reading (ppm):			Trace Silt

COMPARISON SAMPLE DATA

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION

Analysis	Container Requirements	Collected	Other
BTEX/EDB	4 - 5 gal. Encores	✓	
PAH	1 400	✓	
Toc/Foc	1 400	✓	

OBSERVATIONS / NOTES

Other (Applicable)

MS/MSD	Duplicate ID No.:	Signature(s):
		<u>J. Franklin</u>

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name:	<u>Zone B</u>	Sample ID No.:	<u>14SLB060405</u>
Project No.:		Sample Location:	<u>14SLB06</u>
<input type="checkbox"/> Surface Soil		Sampled By:	<u>RJ</u>
<input checked="" type="checkbox"/> Subsurface Soil		C.O.C. No.:	
<input type="checkbox"/> Sediment		Type of Sample:	
<input type="checkbox"/> Other:		<input type="checkbox"/> Low Concentration	
<input type="checkbox"/> QA Sample Type:		<input type="checkbox"/> High Concentration	

FIELD SAMPLE DATA:			
Date:	<u>6/2/99</u>	Depth:	<u>4-5' bgs</u>
Time:	<u>1540</u>	Color:	<u>brown</u>
Method:		Description (Sand, Silt, Clay, Moisture, etc.):	<u>Sandy clay</u>
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>BTEX/EDB</u>	<u>4-95g Eucor</u>	<u>✓</u>	
<u>PAH</u>	<u>140g</u>	<u>✓</u>	

OBSERVATIONS / NOTES:		DATE
MS/MSD	Duplicate ID No.:	Signature(s):
		<u>[Signature]</u>

MONITORING WELL DEVELOPMENT RECORD

Page ____ of ____

Well: MW-1
 Site: 14
 Date Installed: _____
 Date Developed: 7-2-99
 Dev. Method: Pump
 Pump Type: _____

Depth to Bottom (ft.): 13.95
 Static Water Level Before (ft.): 4.41
 Static Water Level After (ft.): _____
 Screen Length (ft.): 10.0'
 Specific Capacity: 1.55
 Casing ID (in.): 2"

Responsible Personnel: R.H. /
 Drilling Co.: Custom Drilling
 Project Name: _____
 Project Number: _____

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
								D.O
1145		1		27.1	6.09	.588	999	Gray 2.77
1152		10		22.5	6.13	.516	999	" 5.50
1154		20		22.1	6.06	.493	999	" 5.55
1156		30		22.0	6.01	.475	999	" 5.31
1158		40		22.1	6.08	.478	999	" 5.55
1201		45		21.9	6.02	.467	600	" 5.25
1205		50		22.1	6.01	.447	277	" 5.20
1207		55		22.1	5.99	.442	204	" 5.28
1213		65		22.0	5.96	.475	650	" 5.40
1216		75		21.9	5.99	.461	749	" 5.11
1221		80		22.4	6.03	.483	561	" 5.23
1228		85		21.8	5.89	.481	306	" 4.11
1230		95		21.6	5.86	.465	121	" 4.15
1231		100		21.5	5.86	.473	95	cloudy 4.60
1234		105		21.6	5.90	.473	26	" 4.56
								Total Purged
								105 gals.

Drum # DW-CNC14-MW01

Page of

Responsible Personnel: J. Hofer
Drilling Co.: Euston
Project Name: CNC
Project Number: 0141

[illegible]

Page of

Depth to Bottom (ft.): 14
 Static Water Level Before (ft.): 4.21
 Static Water Level After (ft.): _____
 Screen Length (ft.): 10 ft
 Specific Capacity: _____
 Casing ID (in.): 2"

Responsible Personnel: J. Hofer
Drilling Co.: Custom Drilling
Project Name: CNC
Project Number: 8141

[illegible]

Project Name: Site 14 Project No.: 0141
Location: CNE Charleston Personnel: Jason Mann / Thomas Thompson
Weather Conditions: Partly Cloudy Measuring Device: _____
Tidally Influenced: Yes ☐ No ☒ Remarks: _____

* All measurements to the nearest 0.01 foot



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 1 of 3

Project Site Name: <u>CNC Site 14</u>	Sample ID No.: <u>14GLM0101</u>
Project No.: <u>N0141</u>	Sample Location: <u>CNC 14 MW01</u>
Sampled By: <u>JJM ETT.</u>	Duplicate: <input type="checkbox"/>
Field Analyst: <u>JJM</u>	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <u>[Signature]</u>	

SAMPLING DATA:

Date: <u>9/8/98</u>	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time: <u>1225</u>	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method: <u>peristaltic</u>	<u>clear</u>	<u>-</u>	<u>0.618</u>	<u>22.0</u>	<u>8</u>	<u>2.39</u>	<u>-</u>	<u>6.64</u>

SAMPLE COLLECTION/ANALYSIS INFORMATION:**Dissolved Oxygen:**

Equipment: HACH Digital Titrator OX-DT

CHEMetrics (Range: 0-1 mg/L)Analysis Time: 14:48

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	= mg/L
	x 0.02	= mg/L

CHEMetrics: 0.6 mg/L

Notes:

Alkalinity:

Equipment:

HACH Digital Titrator AL-DT

CHEMetrics (Range: _____ mg/L)

Analysis Time: 10:15Filtered: ☐

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	= mg/L
<input type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	= mg/L
<input checked="" type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	<u>0</u> & <u>267</u>	x 1.0	= <u>267</u> mg/L
<input type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	= mg/L
<input type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	= mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	= mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	<u>0</u>	<u>0</u>	<u>267</u>

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____**Carbon Dioxide:**

Equipment:

HACH Digital Titrator CA-DT

CHEMetrics (Range: _____ mg/L)

Analysis Time: 11:04

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2
<input checked="" type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count	Concentration
	x 0.1 = mg/L
	x 0.2 = mg/L
	x 1.0 = mg/L
<u>262</u>	x 2.0 = <u>524</u> mg/L

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____



FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 2 of 3

Project Site Name: <u>CNC site 14</u>		Sample ID No.: <u>14GLM0101</u>	
Project No.: <u>N0141</u>		Sample Location: <u>CNC 14 NW01</u>	
Sampled By: <u>JTM & TT</u>		Duplicate: <input type="checkbox"/>	
Field Analyst: <u>JTM</u>		Blank: <input type="checkbox"/>	
Field Form Checked as per QA/QC Checklist (initials): <u>[Signature]</u>			
SAMPLE COLLECTION/ANALYSIS INFORMATION:			
Sulfide (S²⁻):			
Equipment: DR-700	<u>DR-850</u>	HS-C Color Chart	HS-WR Color Wheel
Program/Module: 610nm	93	Other: _____	Analysis Time: <u>1420</u>
Concentration: <u>0.13</u> mg/L			Filtered: <input type="checkbox"/>
Notes: _____			
Sulfate (SO₄²⁻):			
Equipment: DR-700	DR-8	Other: _____	Analysis Time: _____
Program/Module: _____	91		
Concentration: _____ mg/L			Filtered: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____		
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____		
Notes: _____			
Nitrite (NO₂⁻-N):			
Equipment: DR-700	<u>DR-850</u>	Other: _____	Analysis Time: <u>14156</u>
Program/Module: _____	60		Filtered: <input type="checkbox"/>
Concentration: <u>0.048</u> mg/L			Reagent Blank Correction: <input type="checkbox"/>
		Standard Solution: <input type="checkbox"/>	Results: <input type="checkbox"/>
Notes: _____			
Nitrate (NO₃⁻-N):			
Equipment: DR-700	DR-8	Other: _____	Analysis Time: _____
Program/Module: _____	55		Filtered: <input type="checkbox"/>
Concentration: _____ mg/L			Nitrite Interference Treatment: <input type="checkbox"/>
Standard Solution: <input type="checkbox"/>	Results: _____		Reagent Blank Correction: <input type="checkbox"/>
Standard Additions: <input type="checkbox"/>	Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____		
Notes: _____			



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 3 of 3

Project Site Name:	CNC site 14	Sample ID No.:	14 GLM 0101
Project No.:	W0141	Sample Location:	CNC 14 MW01
Sampled By:	JTM TT	Duplicate:	<input type="checkbox"/>
Field Analyst:	JTM	Blank:	<input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials):			

SAMPLE COLLECTION/ANALYSIS INFORMATION

Manganese (Mn²⁺):

Equipment: DR-700 DR-850 HACH MN-5 Other: _____ Analysis Time: 12:30

Program/Module: 525nm 41

Concentration: 0.0 mg/L Filtered: ☐

Standard Solution: ☐ Results: _____ Digestion: ☐

Standard Additions: ☐ Reagent Blank Correction: ☐

Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700 DR-850 IR-18C Color Wheel Other: _____ Analysis Time: 11:30

Program/Module: 500nm 33

Concentration: 3.04 mg/L Filtered: ☐

Notes: _____

Hydrogen Sulfide (H₂S):

Equipment: HS-C Other: _____ Analysis Time: 11:39

Concentration: 3.0 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes: _____

QA/QC Checklist:

- All data fields have been completed as necessary: ☒
- Correct measurement units are cited in the SAMPLING/DATA block: ☒
- Multiplication is correct for each Multiplier table: ☒
- Final calculated concentration is within the appropriate Range Used block: ☒
- Alkalinity Relationship is determined appropriately as per manufacturer instructions: ☒
- QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☒
- Nitrite Interference treatment used for Nitrate test if Nitrite was detected: ☒
- Title block is initialized by person who performed the QA/QC Checklist: ☒



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 1 of 3

Project Site Name:	CNC SITE 14	Sample ID No.:	14GLM0201
Project No.:	20141	Sample Location:	CNC 14 MW02
Sampled By:	JTM HTT	Duplicate:	<input type="checkbox"/>
Field Analyst:	JTM	Blank:	<input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials):		JTM	

SAMPLING DATA:

Date:	9/8/99	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time:	1430	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method:	peristaltic	clear	-	1.24	22.9	0	0.73	-	6.52

SAMPLE COLLECTION/ANALYSIS INFORMATION:**Dissolved Oxygen:**

Equipment: HACH Digital Titrator OX-DT

CHEMetrics (Range: 0-1 mg/L)Analysis Time: 14:45

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	= mg/L
	x 0.02	= mg/L

CHEMetrics: 0.4 mg/L

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT

CHEMetrics (Range: _____ mg/L)

Analysis Time: _____

Filtered: ☐

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	= mg/L
<input type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	= mg/L
<input checked="" type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	= mg/L
<input checked="" type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	0 & 208	x 2.0	= 416 mg/L
<input type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	= mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	= mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	0	0	416

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____**Carbon Dioxide:**

Equipment: HACH Digital Titrator CA-DT

CHEMetrics (Range: _____ mg/L)

Analysis Time: 11:09

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2
<input checked="" type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count	Multiplier	Concentration
	x 0.1	= mg/L
	x 0.2	= mg/L
	x 1.0	= mg/L
362	x 2.0	= 724 mg/L

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 2 of 3

Project Site Name: <u>cwc site 14</u>	Sample ID No.: <u>14 GCM 0201</u>
Project No.: <u>N0141</u>	Sample Location: <u>cwc 14 MW02</u>
Sampled By: <u>JJM FTT</u>	Duplicate: <input type="checkbox"/>
Field Analyst: <u>JJM</u>	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <u>[Signature]</u>	

SAMPLE COLLECTION/ANALYSIS INFORMATION

Sulfide (S^{2-}):

Equipment: DR-700 DR-850 HS-C Color Chart HS-WR Color Wheel Analysis Time: 12:55
Program/Module: 610nm 93 Other: _____
Concentration: 0.0 mg/L Filtered: ☐
Notes: _____

Sulfate (SO_4^{2-}):

Equipment: DR-700 DR-850 Other: _____ Analysis Time: _____
Program/Module: 91
Concentration: _____ mg/L Filtered: ☐
Standard Solution: ☐ Results: _____
Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____
Notes: _____

Nitrite (NO_2^- -N):

Equipment: DR-700 DR-850 Other: _____ Analysis Time: 14:50
Program/Module: 60 Filtered: ☐
Concentration: 0.055 mg/L Reagent Blank Correction: ☐
Standard Solution: ☐ Results: ☐
Notes: _____

Nitrate (NO_3^- -N):

Equipment: DR-700 DR-850 Other: _____ Analysis Time: _____
Program/Module: 55 Filtered: ☐
Concentration: _____ mg/L Nitrite Interference Treatment: ☐
Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐
Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____
Notes: _____



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 3 of 3

Project Site Name: <u>CNC SITE 14</u>	Sample ID No.: <u>14 GLM 0201</u>
Project No.: <u>N0141</u>	Sample Location: <u>CNC 14 MW02</u>
Sampled By: <u>JSM & TS</u>	Duplicate: <input type="checkbox"/>
Field Analyst: <u>JSM</u>	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <u>[Signature]</u>	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Manganese (Mn²⁺):

Equipment: DR-700 DR-850 HACH MN-5 Other: _____ Analysis Time: 12:20

Program/Module: 525nm 41

Concentration: 0.2 mg/L

Filtered: ☐

Digestion: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700 DR-850 IR-18C Color Wheel Other: _____ Analysis Time: 11:41

Program/Module: 500nm 33

Concentration: 3.36 mg/L

Filtered: ☐

Notes: Limit

Hydrogen Sulfide (H₂S):

Equipment: HS-C Other: _____ Analysis Time: 11:47

Concentration: 0.5 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes: _____

QA/QC Checklist:

All data fields have been completed as necessary: ☒

Correct measurement units are cited in the SAMPLING DATA block: ☒

Multiplication is correct for each Multiplier table: ☒

Final calculated concentration is within the appropriate Range Used block: ☒

Alkalinity Relationship is determined appropriately as per manufacturer instructions: ☒

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☒

Nitrite Interference treatment used for Nitrate test if Nitrite was detected: ☒

Title block is initialized by person who performed the QA/QC Checklist: ☒



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 1 of 3

Project Site Name:	CNE Site 14	Sample ID No.:	14 G6M 0301
Project No.:	N0141	Sample Location:	CNE 14 MW03
Sampled By:	JJM & TT	Duplicate:	<input type="checkbox"/>
Field Analyst:	JJM	Blank:	<input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials):			

SAMPLING DATA:

Date:	9/8/99	Color	ORP (Eh)	S.C.	Temp.	Turbidity	DO	Sal.	pH
Time:	1210	(Visual)	(+/- mv)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(%)	(SU)
Method:	peristaltic	clear	-	5.29	22.0	0	1.27	-	6.03

SAMPLE COLLECTION/ANALYSIS INFORMATION:**Dissolved Oxygen:**

Equipment: HACH Digital Titrator OX-DT CHEMetrics (Range: 1-12 mg/L) Analysis Time: 14:53

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	1-5 mg/L	200 ml	0.200 N	0.01		x 0.01	= mg/L
<input type="checkbox"/>	2-10 mg/L	100 ml	0.200 N	0.02		x 0.02	= mg/L

CHEMetrics: 1.0 mg/L

Notes:

Alkalinity:Equipment: HACH Digital Titrator AL-DT CHEMetrics (Range: _____ mg/L) Analysis Time: 10:50 Filtered: ☐

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
<input type="checkbox"/>	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	= mg/L
<input checked="" type="checkbox"/>	40-160 mg/L	25 ml	0.1600 N	0.4	0 & 140	x 0.4	= 56 mg/L
<input type="checkbox"/>	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	= mg/L
<input type="checkbox"/>	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	= mg/L
<input type="checkbox"/>	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	= mg/L
<input type="checkbox"/>	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	= mg/L

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	0	0	56

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____**Carbon Dioxide:**

Equipment: HACH Digital Titrator CA-DT CHEMetrics (Range: _____ mg/L) Analysis Time: 11:15

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Concentration
<input type="checkbox"/>	10-50 mg/L	200 ml	0.3636 N	0.1		x 0.1 = mg/L
<input type="checkbox"/>	20-100 mg/L	100 ml	0.3636 N	0.2		x 0.2 = mg/L
<input type="checkbox"/>	100-400 mg/L	200 ml	3.636 N	1.0		x 1.0 = mg/L
<input checked="" type="checkbox"/>	200-1000 mg/L	100 ml	3.636 N	2.0	168	x 2.0 = 336 mg/L

CHEMetrics: _____ mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 2 of 3

Project Site Name:	CNC Site 14	Sample ID No.:	14GLM0301
Project No.:	N0141	Sample Location:	CNC 14 MW03
Sampled By:	JJM & TT	Duplicate:	<input checked="" type="checkbox"/>
Field Analyst:	JJM	Blank:	<input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials):			

SAMPLE COLLECTION/ANALYSIS INFORMATION

Sulfide (S^{2-}):

Equipment:	DR-700	<u>DR-850</u>	HS-C Color Chart	HS-WR Color Wheel	Analysis Time:	14:30
Program/Module:	610nm	93	Other:			
Concentration:	0.0	mg/L	Filtered:		<input type="checkbox"/>	
Notes:						

Sulfate (SO_4^{2-}):

Equipment:	DR-700	DR-8	Other:	Analysis Time:		
Program/Module:		91				
Concentration:		mg/L	Filtered:		<input type="checkbox"/>	
Standard Solution:	<input type="checkbox"/>	Results:				
Standard Additions:	<input type="checkbox"/>	Digits Required: 0.1ml:	0.2ml:	0.3ml:		
Notes:						

Nitrite (NO_2^- -N):

Equipment:	DR-700	<u>DR-850</u>	Other:	Analysis Time:	14:58
Program/Module:		60			
Concentration:	0.034	mg/L	Filtered:		<input type="checkbox"/>
		Reagent Blank Correction:	<input type="checkbox"/>		
		Standard Solution:	Results:	<input type="checkbox"/>	
Notes:					

Nitrate (NO_3^- -N):

Equipment:	DR-700	DR-8	Other:	Analysis Time:	
Program/Module:		55			
Concentration:		mg/L	Filtered:		<input type="checkbox"/>
		Nitrite Interference Treatment:	<input type="checkbox"/>		
		Reagent Blank Correction:	<input type="checkbox"/>		
Standard Solution:	<input type="checkbox"/>	Results:			
Standard Additions:	<input type="checkbox"/>	Digits Required: 0.1ml:	0.2ml:	0.3ml:	
Notes:					



FIELD ANALYTICAL LOG SHEET GEOCHEMICAL PARAMETERS

Tetra Tech NUS, Inc.

Page 3 of 3

Project Site Name: <u>CNC Site 14</u>	Sample ID No.: <u>14GLM0301</u>
Project No.: <u>10141</u>	Sample Location: <u>CNC 14 NW03</u>
Sampled By: <u>JJM & TT</u>	Duplicate: <input type="checkbox"/>
Field Analyst: <u>JJM</u>	Blank: <input type="checkbox"/>
Field Form Checked as per QA/QC Checklist (initials): <u>JJM</u>	

SAMPLE COLLECTION/ANALYSIS INFORMATION

Manganese (Mn²⁺):

Equipment: DR-700 DR-850 HACH MN-5 Other: _____ Analysis Time: 12:40
Program/Module: 525nm 41
Concentration: 6.7 mg/L Filtered: ☐
Standard Solution: ☐ Results: _____ Digestion: ☐
Standard Additions: ☐ Reagent Blank Correction: ☐
Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: _____

Ferrous Iron (Fe²⁺):

Equipment: DR-700 DR-850 IR-18C Color Wheel Other: _____ Analysis Time: 11:50
Program/Module: 500nm 33
Concentration: 3.30 mg/L Filtered: ☐

Notes: Limf

Hydrogen Sulfide (H₂S):

Equipment: HS-C Other: _____ Analysis Time: 11:55
Concentration: 0.1 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes: _____

QA/QC Checklist:

All data fields have been completed as necessary: ☒
Correct measurement units are cited in the SAMPLING DATA block: ☒
Multiplication is correct for each Multiplier table: ☒
Final calculated concentration is within the appropriate Range Used block: ☒
Alkalinity Relationship is determined appropriately as per manufacturer instructions: ☒
QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☒
Nitrite Interference treatment used for Nitrate test if Nitrite was detected: ☒
Title block is initialized by person who performed the QA/QC Checklist: ☒

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>CNC 14</u> Project No.: _____ <input type="checkbox"/> Domestic Well Data <input checked="" type="checkbox"/> Monitoring Well Data <input type="checkbox"/> Other Well Type: _____ <input type="checkbox"/> QA Sample Type: _____	Sample ID No.: <u>14GLMØ1Ø1</u> Sample Location: <u>MW-1</u> Sampled By: <u>ER/RN</u> C.O.C. No.: _____ Type of Sample: <input type="checkbox"/> Low Concentration <input type="checkbox"/> High Concentration
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

SAMPLING DATA:								
Date: <u>7-13-99</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1255</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: _____								

PURGE DATA:								
Date: <u>7-13-99</u>	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: <u>Slow Purge</u>	Initial	6.14	.599	21.4	9	2.44		
Monitor Reading (ppm):	1	6.16	.592	21.0	3	2.23		
Well Casing Diameter & Material	2	6.20	.567	20.9	Ø	2.84		
Type:	3	6.20	.548	21.3	Ø	2.86		
Total Well Depth (TD):	<u>14.26</u>							
Static Water Level (WL):	<u>4.67'</u>							
One Casing Volume(gal/L):	<u>1556 #15</u>							
Start Purge (hrs):	<u>1115</u>							
End Purge (hrs):	<u>1255</u>							
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>BTEX, Nap., MTBE</u>	<u>HCl</u>	<u>3 x 40 ml vials</u>	
<u>PAH</u>	<u>None</u>	<u>2 x 1 L amber</u>	
<u>Lead</u>	<u>HNO3</u>	<u>250 ml. plastic</u>	

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s): <u>E. J. Hamilton</u>
MS/MSD	Duplicate ID No.: _____	

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>CNC Site 14</u>	Sample ID No.: <u>CNC14MWD01</u>
Project No.: <u>N0141</u>	Sample Location: <u>Site 14</u>
<input type="checkbox"/> Domestic Well Data	Sampled By: <u>JJM & TT</u>
<input checked="" type="checkbox"/> Monitoring Well Data	C.O.C. No.: _____
<input type="checkbox"/> Other Well Type: _____	Type of Sample: _____
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> Low Concentration
	<input type="checkbox"/> High Concentration

SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>9/8/99</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: <u>1225</u>	<u>CRDY</u>	<u>6.60</u>	<u>0.48</u>	<u>22.0</u>	<u>0</u>	<u>2.39</u>	<u>—</u>	<u>—</u>
Method: <u>peristaltic</u>								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
<u>9-8-99</u>	Initial	<u>6.18</u>	<u>.610</u>	<u>22.2</u>	<u>0</u>	<u>0.74</u>	<u>—</u>	<u>—</u>
Method: <u>peristaltic</u>								
Monitor Reading (ppm): <u>0</u>	1	<u>6.48</u>	<u>.638</u>	<u>22.3</u>	<u>0</u>	<u>0.84</u>	<u>—</u>	<u>1.53 gal</u>
Well Casing Diameter & Material	2	<u>6.47</u>	<u>.600</u>	<u>21.9</u>	<u>0</u>	<u>0.75</u>	<u>—</u>	<u>3.06 gal</u>
Type: <u>2" PVC</u>	3	<u>6.61</u>	<u>.671</u>	<u>22.0</u>	<u>0</u>	<u>0.76</u>	<u>—</u>	<u>4.59 gal</u>
Total Well Depth (TD): <u>1426</u>	4	<u>6.57</u>	<u>.618</u>	<u>22.0</u>	<u>0</u>	<u>1.36</u>	<u>—</u>	<u>6.12 gal</u>
Static Water Level (WL): <u>4.71</u>	5	<u>6.60</u>	<u>.618</u>	<u>22.0</u>	<u>0</u>	<u>2.39</u>	<u>—</u>	<u>7.65 gal</u>
One Casing Volume (gal): <u>1.53</u>								
Start Purge (hrs): <u>0930</u>								
End Purge (hrs): <u>1002</u>								
Total Purge Time (min): <u>32</u>								
Total Vol. Purged (gal/L): <u>7.65</u>								

ml/min
Flow R
850
850
850
850
850
850

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>Ammonia</u>	<u>—</u>	<u>500 mL Plastic</u>	<u>YPS</u>
<u>PAH</u>	<u>—</u>	<u>1 Liter Amber</u>	<u>QPS No</u>
<u>BTEX, EOB, MTBE, Total nap.</u>	<u>HCl</u>	<u>40 mL glass</u>	<u>QPS No</u>
<u>D.S. Methane</u>	<u>HCl</u>	<u>40 mL glass</u>	<u>YPS</u>

OBSERVATIONS / NOTES:

DTW	Time	Volume
<u>5.20</u>	<u>0934</u>	<u>1</u>
<u>5.22</u>	<u>0941</u>	<u>2</u>
<u>5.23</u>	<u>0948</u>	<u>3</u>
<u>5.22</u>	<u>0955</u>	<u>4</u>
<u>5.22</u>	<u>1002</u>	<u>5</u>

Circle if Applicable:		Signature(s): <u>Thomas Rousper</u>
MS/MSD	Duplicate ID No.: _____	

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: <u>CNC/Site 14</u>	Sample ID No.: <u>CNC14MWD2</u>
Project No.: <u>N0141</u>	Sample Location: <u>Site 14</u>
<input type="checkbox"/> Domestic Well Data	Sampled By: <u>TJM & TT</u>
<input checked="" type="checkbox"/> Monitoring Well Data	C.O.C. No.: _____
<input type="checkbox"/> Other Well Type: _____	Type of Sample:
<input type="checkbox"/> QA Sample Type: _____	<input type="checkbox"/> Low Concentration
	<input type="checkbox"/> High Concentration

SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
9/8/99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 061430								
Method: peristaltic	1100V	6.52	1.24	22.9	0	0.73	—	—

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
9/8/99	Initial	6.50	1.45	23.6	0	1.28	—	—
Method: peristaltic	1	6.56	1.44	23.3	0	1.55	—	1.47 gal
Monitor Reading (ppm): 0	2	6.59	1.36	23.0	0	1.31	—	2.94 gal
Well Casing Diameter & Material	3	6.54	1.27	23.0	0	1.14	—	4.41 gal
Type: 2" PVC	4	6.53	1.24	22.9	0	1.08	—	5.88 gal
Total Well Depth (TD): 14.35	5	6.52	1.24	22.9	0	0.73	—	7.35 gal
Static Water Level (WL): 5.15								
One Casing Volume (gal/L): 1.47								
Start Purge (hrs): 0931								
End Purge (hrs): 1006								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): 7.35								

ml/min
Flow Rate

850

"

"

"

"

"

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Anions	—	500ml plastic	yes
PAH	—	1 L Amber	yes
BTEX, EOB, MTBE, Total Aop.	HCL	down glass	yes
Dis. Methane	HCL	down glass	yes

OBSERVATIONS / NOTES:

Volume	Time	DTW			
1	0938	5.49	4	0959	5.53
2	0945	5.52			
3	0952	5.52	5	1006	5.53

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	Signature(s): 

GROUNDWATER SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: CNC Site 14
Project No.: N0141

Sample ID No.: CNC14MW03
Sample Location: Site 14
Sampled By: JTM & TT
C.O.C. No.: _____
Type of Sample:
☐ Low Concentration
☐ High Concentration

- ☐ Domestic Well Data
☐ Monitoring Well Data
☐ Other Well Type: _____
☐ QA Sample Type: _____

SAMPLING DATA:

Date: <u>9/8/99</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1210</u>	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: <u>peristaltic</u>	<u>1166</u>	<u>6.03</u>	<u>5.29</u>	<u>22.0</u>	<u>0</u>	<u>1.27</u>	<u>-</u>	<u>-</u>

PURGE DATA:

Date: <u>9-8-99</u>	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: <u>peristaltic</u>	Initial	<u>6.01</u>	<u>4.86</u>	<u>22.7</u>	<u>0</u>	<u>1.23</u>	<u>-</u>	<u>-</u>
Monitor Reading (ppm): <u>0</u>	1	<u>6.21</u>	<u>4.75</u>	<u>22.4</u>	<u>0</u>	<u>1.10</u>	<u>-</u>	<u>1.42 gal</u>
Well Casing Diameter & Material	2	<u>6.08</u>	<u>4.93</u>	<u>22.0</u>	<u>0</u>	<u>1.17</u>	<u>-</u>	<u>2.84 gal</u>
Type: <u>2" PVC</u>	3	<u>6.03</u>	<u>5.21</u>	<u>22.0</u>	<u>0</u>	<u>0.76</u>	<u>-</u>	<u>4.26 gal</u>
Total Well Depth (TD): <u>13.07</u>	4	<u>6.05</u>	<u>5.32</u>	<u>22.0</u>	<u>0</u>	<u>1.34</u>	<u>-</u>	<u>5.68 gal</u>
Static Water Level (WL): <u>4.20</u>	5	<u>6.03</u>	<u>5.29</u>	<u>22.0</u>	<u>0</u>	<u>1.27</u>	<u>-</u>	<u>7.10 gal</u>
One Casing Volume (gal): <u>1.42</u>								
Start Purge (hrs): <u>0934</u>								
End Purge (hrs): <u>1010</u>								
Total Purge Time (min): <u>36</u>								
Total Vol. Purged (gal/L): <u>7.10</u>								

ml/min
Flow Rate
800
800
800

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>ANIONS</u>	<u>-</u>	<u>500ml plastic</u>	<u>yes</u>
<u>PAH</u>	<u>-</u>	<u>1L Amber</u>	<u>yes</u>
<u>DTX, EOB, MTBE, Toluene</u>	<u>HCL</u>	<u>400ml glass</u>	<u>yes</u>
<u>DSS, Methane</u>	<u>HCL</u>	<u>400ml glass</u>	<u>yes</u>

OBSERVATIONS / NOTES:

Volume	Time	DTW		
1	0942	4.57	4	0910 1003 4.55
2	0949	4.57	5	1010 4.55
3	0956	4.55		

Circle if Applicable:

MS/MSD

Duplicate ID No.: _____

Signature(s):



**SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON**

Sample Receipt

The following samples were received on June 3, 1999 and were logged in under Katahdin Analytical Services work order number WP2729 for a hardcopy due date of July 3, 1999.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>	<u>GEL</u> <u>Sample No.</u>
WP2729-1	14SLB020203	9906097-01
WP2729-2	14SLB020203D	9906097-02
WP2729-3	14SLB060405	
WP2729-4	15SLB020405D	9906097-06
WP2729-5	15SLB040405	
WP2729-6	14SLB040304	
WP2729-7	15SLB020405	9906097-05
WP2729-8	14SLB050304	9906097-03
WP2729-9	15SLB010405	9906097-04
WP2729-10	14TL00401	
WP2729-11	29SLB050809	9906097-07

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

One aqueous and nine soil samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on June 3, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-F and 5972-Z instruments. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate was performed on any sample in this workorder.

0000002

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

Two initial calibration curves are reported in this workorder. Both calibrations had several analytes exceeding the maximum allowable 15% RSD. The average %RSD for the 5972-F was 13.4%, and the 5972-Z had an average %RSD of 14.8%.

Sample WP2729-1, 2, 3, 5, 6, 7,8, and 9 required reanalysis due to surrogate or internal standard recovery deviations in the initial analysis to confirm matrix interference, both analyses are included.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organics Extraction and Analysis

Nine soil/sediment samples were received by Katahdin Analytical Services laboratory on June 3, 1999 for analysis in accordance with 8270C for the PAH list of analytes.

Extraction of the samples occurred following USEPA method 3540 on June 8, 1999. A laboratory control spike consisting of all PAH analytes spiked into organic free sand, was extracted in the batch.

The initial calibration curves analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curves analyzed in this SDG, the average %RSD for all analytes was 9.4% and 11.5%, making the curves acceptable.

Initial analysis of sample WP2729-2 yielded internal standard area recovery deviations and target analyte concentrations over the upper limit of the calibration curve. Reanalysis occurred at a 1:5 dilution successfully. Both sets of data are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible

0000003

analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Wet Chemistry Analysis

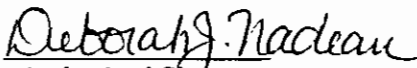
For work order WP2729 the analyses for Total Combustible Organics (TCO) have been performed in accordance with the "Annual Book of ASTM Standards", 1987. Analyses for Solids-Total Residue (TS) for work order WP2729 samples have been performed in accordance with "Contract Laboratory Program Statement of Work for Inorganic Analysis".

All analyses were performed within analytical hold time. No protocol deviations were noted by the Wet Chemistry laboratory staff.

Subcontracted Analysis

Analyses for Total Organic Carbon, Total Petroleum Hydrocarbons and Grain size were subcontracted to outside laboratories. All sets of data are included as separate sections to the data package.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and/or his designee, as verified by the following signature.


Authorized Signature
7-29-99

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP 2729

PAGE: 1 OF 1

COOLER: 1 OF 1

COC# —

SDG# —

DATE / TIME RECEIVED: 6-3-99 0945

DELIVERED BY: FedEx

RECEIVED BY: Sam

LIMS ENTRY BY: Sam

LIMS REVIEW BY / PM: APC

CLIENT: Tetra Tech

PROJECT: Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.9</u>	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative used.

000005



P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client Tetra Tech NUS Contact Bryn Hawze Phone # (848) 814 9080 Fax # ()

Address NH21 Ave H City N. Charleston State SC Zip Code 29405

Purchase Order # _____ Proj. Name / No. _____ Katahdin Quote # _____

Bill (if different than above) _____ Address _____

Sampler (Print / Sign) Roger Franklin / [Signature] Copies To: _____

LAB USE ONLY WORK ORDER #: WP2729 KATAHDIN PROJECT MANAGER _____

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

REMARKS: _____

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: 809609650243

TEMP °C _____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON	Filt. OYON
14SLB020203	6/24/1450		5	1	4									2
14SLB040304	6/24/1505		5	1	4	1								0
D 14SLB020203D	6/24/1450		5	1	4									2
14SLB050304	11/1525		5	1	4			1						2
15LB060405	4/1540		5	1	4									1
15SLB010405	11/1220		5	1	4			1					PID? >200	
15SLB020405	11/1230		5	1	4	1							PID? >200	
D 15SLB020405D	11/1230		5	1	4								PID? >200	
15SLB040405	11/1245		5	1	4								PID? >200	
14TL00401	11/1		2		2									
	/													
	/													
	/													
	/													
	/													
	/													
	/													

COMMENTS AC-IV - NFES C Results De: 6-16-99 (BR)

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>6/24/99 1800</u>	Received By: (Signature) <u>809609650243</u>	Relinquished By: (Signature) _____	Date / Time <u>6-3-99 0945</u>	Received By: (Signature) <u>[Signature]</u>
Relinquished By: (Signature) _____	Date / Time _____	Received By: (Signature) _____	Relinquished By: (Signature) _____	Date / Time _____	Received By: (Signature) _____

**New England-ME Laboratory (207) 874-2400
CONFIRMATION**

Page 1

ORDER NO WP-2729

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 06/03/99

PHONE: 850/385-9800

FAX: 850/385-9800

DUE: 03 JUL

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 02 AUG

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP2729-3	14SLB060405	02 JUN 1540	03 JUN	SL
	WP2729-5	15SLB040405	02 JUN 1245		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	135.00	270.00
Volatile Organics by 8260B	SW8260	2	85.00	170.00
Solids-Total Residue (TS)	CLP/CIP SO	2	0.00	0.00
TOTALS		2	220.00	440.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP2729-6	14SLB040304	02 JUN 1505	03 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Wet Lab Subcontract		1	110.00	110.00
TOTALS		1	330.00	330.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3	WP2729-8	14SLB050304	02 JUN 1525	03 JUN	SL
	WP2729-9	15SLB010405	02 JUN 1220		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	135.00	270.00
Volatile Organics by 8260B	SW8260	2	85.00	170.00
Solids-Total Residue (TS)	CLP/CIP SO	2	0.00	0.00
Total Combustible Organics	ASTM D2974	2	30.00	60.00
Wet Lab Subcontract		2	60.00	120.00
TOTALS		2	310.00	620.00

LABORATORY ORDER CONTINUED ON PAGE 2

0000007

ME 6/14/99

**New England-ME Laboratory (207) 874-2400
CONFIRMATION**

Page 2

ORDER NO WP-2729

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 06/03/99
PHONE: 850/385-9899
FAX: 850/385-9860
DUE: 03 JUL
FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 02 AUG

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4	WP2729-10	14TL00401	02 JUN	03 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	85.00	85.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5	WP2729-11	29SLB050809	02 JUN 1055	03 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Wet Lab Subcontract		1	75.00	75.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6	WP2729-1	14SLB020203	02 JUN 1450	03 JUN	SL
	WP2729-2	14SLB020203D	02 JUN 1450		
	WP2729-4	15SLB020405D	02 JUN 1230		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	135.00	405.00
Volatile Organics by 8260B	SW8260	3	85.00	255.00
Solids-Total Residue (TS)	CLP/CIP SO	3	0.00	0.00
Wet Lab Subcontract		3	75.00	225.00

TOTALS		3	295.00	885.00
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LABORATORY ORDER CONTINUED ON PAGE 3

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n. alidag

New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 3

ORDER NO WP-2729

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 06/03/99

PHONE: 850/385-98

FAX: 850/385-98

DUE: 03 JUL

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
661 ANDERSEN DRIVE, FOSTER PLAZA VII
PITTSBURGH, PA 15220-2745

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: R. FRANKLIN

DELIVERED BY: FEDEX

DISPOSE: AFTER 02 AUG

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7	WP2729-7	15SLB020405	02 JUN 1230	03 JUN	SL

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	1	135.00	135.00
Volatile Organics by 8260B	SW8260	1	85.00	85.00
Solids-Total Residue (TS)	CLP/CIP SO	1	0.00	0.00
Wet Lab Subcontract		1	185.00	185.00
TOTALS		1	405.00	405.00

ORDER NOTE: QC-IV NFESC-D
DD(KAS007QC-DB3)
CNC CHARLESTON

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220
REPORT & DISK

INVOICE: With Report

TOTAL ORDER AMOUNT \$2,840.00

This is NOT an Invo:

AJC/BKR/WEST.AJC(dw)

06-14Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000009

06/11/99

KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
O-13	Internal standard area(s) are out of criteria. Reanalysis confirmed matrix interference.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2729-1
Report Date: 07/28/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 6 of 9

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED	
14SLB020203	Solid			R. FRANKLIN		06/02/99	06/03/99
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	78.	wt %	1.0	0.10	CLP/CIP SOW	06/07/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/04/99 by JF

07/28/99

LJO/baeajc(dw)/msm
PF04TSS0
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-1
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 78
Method: EPA 8270
Date Analyzed: 7/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
1RYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	48	%	1.3		
2-FLUOROBIPHENYL	61	%	1.3		
TERPHENYL-D14	80	%	1.3		

Port Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-1
SDG: WP2729
Report Date: 7/6/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 78
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203	SL	6/2/99	6/3/99	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<7	ug/Kg	1.4	7	5
TOLUENE	<7	ug/Kg	1.4	7	5
1,2-DIBROMOETHANE	<7	ug/Kg	1.4	7	5
ETHYLBENZENE	<7	ug/Kg	1.4	7	5
NAPHTHALENE	<7	ug/Kg	1.4	7	5
MTBE	<7	ug/Kg	1.4	7	5
TOTAL XYLENES	<7	ug/Kg	1.4	7	5
DIBROMOFLUOROMETHANE	\$68	%	1.4		
1,2-DICHLOROETHANE-D4	71	%	1.4		
TOLUENE-D8	\$36	%	1.4		
P-BROMOFLUOROBENZENE	\$13	%	1.4		

Report Notes: \$, O-13



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-1RA
SDG: WP2729
Report Date: 7/6/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 78
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203	SL	6/2/99	6/3/99	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<7	ug/Kg	1.4	7	5
TOLUENE	<7	ug/Kg	1.4	7	5
1,2-DIBROMOETHANE	<7	ug/Kg	1.4	7	5
ETHYLBENZENE	<7	ug/Kg	1.4	7	5
NAPHTHALENE	<7	ug/Kg	1.4	7	5
MTBE	<7	ug/Kg	1.4	7	5
TOTAL XYLENES	<7	ug/Kg	1.4	7	5
DIBROMOFLUOROMETHANE	124	%	1.4		
1,2-DICHLOROETHANE-D4	125	%	1.4		
TOLUENE-D8	101	%	1.4		
p-BROMOFLUOROBENZENE	160	%	1.4		

Report Notes: \$, O-13

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2729-2
Report Date: 07/28/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 7 of 9

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED		
14SLB020203D	Solid			R. FRANKLIN		06/02/99	06/03/99	
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Solids-Total Residue (TS)	86.	wt %	1.0	0.10	CLP/CIP SCW	06/07/99	JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/04/99 by JF

07/28/99

LJO/baeajc (dw) /msm
PF04TSS0
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.

KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-2
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 86
Method: EPA 8270
Date Analyzed: 7/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203D	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	4200	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	1800	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	3000	ug/Kg	1.2	400	330
FLUORENE	3100	ug/Kg	1.2	400	330
PHENANTHRENE	E13000	ug/Kg	1.2	400	330
ANTHRACENE	3800	ug/Kg	1.2	400	330
FLUORANTHENE	E8500	ug/Kg	1.2	400	330
PYRENE	E14000	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	E6400	ug/Kg	1.2	400	330
HRYSENE	5600	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	E7400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	2500	ug/Kg	1.2	400	330
BENZO[A]PYRENE	5400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	3700	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	970	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	3800	ug/Kg	1.2	400	330
NITROBENZENE-D5	52	%	1.2		
2-FLUOROBIPHENYL	63	%	1.2		
TERPHENYL-D14	102	%	1.2		

port Notes: E, O-13



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-2RA
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 86
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203D	SL	6/2/99	6/3/99	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	<6	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	132	%	1.2		
1,2-DICHLOROETHANE-D4	134	%	1.2		
TOLUENE-D8	107	%	1.2		
P-BROMOFLUOROBENZENE	\$59	%	1.2		

Report Notes: \$, O-13



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-2DL
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 86
Method: EPA 8270
Date Analyzed: 7/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203D	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	5100	ug/Kg	5.8	1900	330
2-METHYLNAPHTHALENE	2200	ug/Kg	5.8	1900	330
ACENAPHTHYLENE	<1900	ug/Kg	5.8	1900	330
ACENAPHTHENE	3700	ug/Kg	5.8	1900	330
FLUORENE	4000	ug/Kg	5.8	1900	330
PHENANTHRENE	18000	ug/Kg	5.8	1900	330
ANTHRACENE	5100	ug/Kg	5.8	1900	330
FLUORANTHENE	15000	ug/Kg	5.8	1900	330
PYRENE	12000	ug/Kg	5.8	1900	330
BENZO[A]ANTHRACENE	7000	ug/Kg	5.8	1900	330
IRYSENE	6700	ug/Kg	5.8	1900	330
BENZO[B]FLUORANTHENE	8500	ug/Kg	5.8	1900	330
BENZO[K]FLUORANTHENE	3500	ug/Kg	5.8	1900	330
BENZO[A]PYRENE	6200	ug/Kg	5.8	1900	330
INDENO[1,2,3-CD]PYRENE	3300	ug/Kg	5.8	1900	330
DIBENZ[A,H]ANTHRACENE	<1900	ug/Kg	5.8	1900	330
BENZO[G,H,I]PERYLENE	4000	ug/Kg	5.8	1900	330
NITROBENZENE-D5	#8	%	5.8		
2-FLUOROBIPHENYL	#13	%	5.8		
TERPHENYL-D14	#16	%	5.6		

Port Notes: O-2, #



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-2
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 86
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB020203D	SL	6/2/99	6/3/99	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	110	%	1.1		
1,2-DICHLOROETHANE-D4	105	%	1.1		
TOLUENE-D8	78	%	1.1		
P-BROMOFLUOROBENZENE	\$39	%	1.1		

Report Notes: \$, O-13

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2729-3
Report Date: 07/28/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 1 of 9

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED	
14SLB060405	Solid			R. FRANKLIN		06/02/99	06/03/99
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	85.	wt %	1.0	0.10	CLP/CIP SOW	06/07/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/04/99 by JF

07/28/99

LJO/baeajc(dw)/msm
PF04TSS0
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-3
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: EPA 8270
Date Analyzed: 7/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB060405	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	48	%	1.2		
2-FLUOROBIPHENYL	53	%	1.2		
TERPHENYL-D14	58	%	1.2		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-3
SDG: WP2729
Report Date: 7/6/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 6/4/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB060405	SL	6/2/99	6/3/99	6/4/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	\$68	%	1.1		
1,2-DICHLOROETHANE-D4	\$65	%	1.1		
TOLUENE-D8	\$56	%	1.1		
BROMOFLUOROBENZENE	\$49	%	1.1		

Port Notes: \$



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-3RA
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 85
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB060405	SL	6/2/99	6/3/99	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.1	6	5
TOLUENE	<6	ug/Kg	1.1	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.1	6	5
ETHYLBENZENE	<6	ug/Kg	1.1	6	5
NAPHTHALENE	<6	ug/Kg	1.1	6	5
MTBE	<6	ug/Kg	1.1	6	5
TOTAL XYLENES	<6	ug/Kg	1.1	6	5
DIBROMOFLUOROMETHANE	\$38	%	1.1		
1,2-DICHLOROETHANE-D4	\$39	%	1.1		
TOLUENE-D8	\$18	%	1.1		
P-BROMOFLUOROBENZENE	\$8	%	1.1		

Report Notes: \$

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2729-6
Report Date: 07/28/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 3 of 9

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED	
14SLB040304	Solid			R. FRANKLIN		06/02/99	06/03/99
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	81.	wt %	1.0	0.10	CLP/CIP SOW	06/07/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/04/99 by JF

07/28/99

LJO/baeajc(dw)/msm
PF04TSS0
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-6
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: EPA 8270
Date Analyzed: 7/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB040304	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<400	ug/Kg	1.2	400	330
2-METHYLNAPHTHALENE	<400	ug/Kg	1.2	400	330
ACENAPHTHYLENE	<400	ug/Kg	1.2	400	330
ACENAPHTHENE	<400	ug/Kg	1.2	400	330
FLUORENE	<400	ug/Kg	1.2	400	330
PHENANTHRENE	<400	ug/Kg	1.2	400	330
ANTHRACENE	<400	ug/Kg	1.2	400	330
FLUORANTHENE	<400	ug/Kg	1.2	400	330
PYRENE	<400	ug/Kg	1.2	400	330
BENZO[A]ANTHRACENE	<400	ug/Kg	1.2	400	330
CHRYSENE	<400	ug/Kg	1.2	400	330
BENZO[B]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[K]FLUORANTHENE	<400	ug/Kg	1.2	400	330
BENZO[A]PYRENE	<400	ug/Kg	1.2	400	330
INDENO[1,2,3-CD]PYRENE	<400	ug/Kg	1.2	400	330
DIBENZ[A,H]ANTHRACENE	<400	ug/Kg	1.2	400	330
BENZO[G,H,I]PERYLENE	<400	ug/Kg	1.2	400	330
NITROBENZENE-D5	59	%	1.2		
2-FLUOROBIPHENYL	66	%	1.2		
TERPHENYL-D14	65	%	1.2		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-6
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB040304	SL	6/2/99	6/3/99	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	128	%	1.3		
1,2-DICHLOROETHANE-D4	128	%	1.3		
TOLUENE-D8	100	%	1.3		
BROMOFLUOROBENZENE	\$57	%	1.3		

Port Notes: \$



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-6RA
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 81
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB040304	SL	6/2/99	6/3/99	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	117	%	1.3		
1,2-DICHLOROETHANE-D4	117	%	1.3		
TOLUENE-D8	84	%	1.3		
P-BROMOFLUOROBENZENE	\$41	%	1.3		

Report Notes: \$, O-13

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-2729-8
Report Date: 07/28/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 4 of 9

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED	
14SLB050304	Solid			R. FRANKLIN		06/02/99	06/03/99
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Solids-Total Residue (TS)	77.	wt %	1.0	0.10	CLP/CIP SOW	06/08/99 JF	1
Total Combustible Organics	6.1	wt %	1.0	0.1	ASTM D2974-8	06/08/99 JF	1

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.
(1) Sample Preparation on 06/07/99 by JF

07/28/99

LJO/baeajc(dw)/msm
PF07TSS1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-8
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 77
Method: EPA 8270
Date Analyzed: 7/15/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB050304	SL	6/2/99	6/3/99	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<430	ug/Kg	1.3	430	330
2-METHYLNAPHTHALENE	<430	ug/Kg	1.3	430	330
ACENAPHTHYLENE	<430	ug/Kg	1.3	430	330
ACENAPHTHENE	<430	ug/Kg	1.3	430	330
FLUORENE	<430	ug/Kg	1.3	430	330
PHENANTHRENE	<430	ug/Kg	1.3	430	330
ANTHRACENE	<430	ug/Kg	1.3	430	330
FLUORANTHENE	<430	ug/Kg	1.3	430	330
PYRENE	<430	ug/Kg	1.3	430	330
BENZO[A]ANTHRACENE	<430	ug/Kg	1.3	430	330
CHRYSENE	<430	ug/Kg	1.3	430	330
BENZO[B]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[K]FLUORANTHENE	<430	ug/Kg	1.3	430	330
BENZO[A]PYRENE	<430	ug/Kg	1.3	430	330
INDENO[1,2,3-CD]PYRENE	<430	ug/Kg	1.3	430	330
DIBENZ[A,H]ANTHRACENE	<430	ug/Kg	1.3	430	330
BENZO[G,H,I]PERYLENE	<430	ug/Kg	1.3	430	330
NITROBENZENE-D5	65	%	1.3		
2-FLUOROBIPHENYL	69	%	1.3		
TERPHENYL-D14	84	%	1.3		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP2729-8
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 77
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB050304	SL	6/2/99	6/3/99	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.2	6	5
TOLUENE	<6	ug/Kg	1.2	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.2	6	5
ETHYLBENZENE	<6	ug/Kg	1.2	6	5
NAPHTHALENE	<6	ug/Kg	1.2	6	5
MTBE	<6	ug/Kg	1.2	6	5
TOTAL XYLENES	<6	ug/Kg	1.2	6	5
DIBROMOFLUOROMETHANE	133	%	1.2		
1,2-DICHLOROETHANE-D4	125	%	1.2		
TOLUENE-D8	103	%	1.2		
BROMOFLUOROBENZENE	58	%	1.2		

Port Notes: \$, O-13



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Caligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-8RA
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 77
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14SLB050304	SL	6/2/99	6/3/99	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<6	ug/Kg	1.3	6	5
TOLUENE	<6	ug/Kg	1.3	6	5
1,2-DIBROMOETHANE	<6	ug/Kg	1.3	6	5
ETHYLBENZENE	<6	ug/Kg	1.3	6	5
NAPHTHALENE	<6	ug/Kg	1.3	6	5
MTBE	<6	ug/Kg	1.3	6	5
TOTAL XYLENES	<6	ug/Kg	1.3	6	5
DIBROMOFLUOROMETHANE	124	%	1.3		
1,2-DICHLOROETHANE-D4	128	%	1.3		
TOLUENE-D8	85	%	1.3		
P-BROMOFLUOROBENZENE	\$58	%	1.3		

Report Notes: \$

KATAHDIN ANALYTICAL SERVICES REPORT OF ANALYTICAL RESULTS

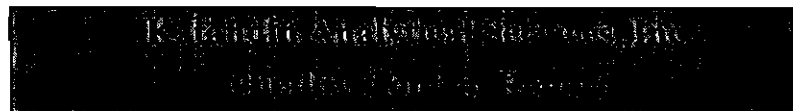
Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP2729-10
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: -
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14TL00401	SL	6/2/99	6/3/99	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	88	%	1.0		
1,2-DICHLOROETHANE-D4	81	%	1.0		
TOLUENE-D8	87	%	1.0		
BROMOFLUOROBENZENE	81	%	1.0		

Report Notes:



Method Blank and Laboratory Control Sample Results

Client:	Tetra Tech NUS
Work Order:	WP2729

METHOD BLANK RESULTS								LABORATORY CONTROL SAMPLE RESULTS				
Parameter	Date of Prep	Date of Analysis	Units	Concentration Measured in Blank	Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
TS -Total Residue	04-Jun-99	07-Jun-99	wt %	< 0.10	< 0.10	0.10	wt %	90	89.5	99.4	80-120	
	07-Jun-99	08-Jun-99	wt %	< 0.10	< 0.10	0.10	wt %			NA	80-120	
TCO	07-Jun-99	08-Jun-99	wt %	< 0.10	< 0.10	0.10	wt %				80-120	

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client:	Tetra Tech NUS
Work Order:	WP2729

DUPLICATE RESULTS**MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS**

Parameter	Sample No	Sample Measurements						Acceptance Range for RPD (%)	Concentration or Quantity				Matrix Spike Recovery (%)				
		Units	Rep 1	Rep 2	Mean Conc	RPD (%)	Units		Sampl Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sample +Spike Dup 2	Acceptance Range (%)	RPD (%)	Acceptance Range (%)
TS	WP2729-9	wt%	94.2	94.3	94.3	0.1	0-20	MS/MSD Not Applicable for this Parameter									
TCO	WP2729-9	wt%	20.4	20.4	20.4	0.0	0-20	MS/MSD Not Applicable for this Parameter									

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: SBLK060899
SDG: WP2729
Report Date: 7/27/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: EPA 8270
Date Analyzed: 7/6/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK060899	SL	-	-	6/8/99	GST	EPA 3540	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<330	ug/Kg	1.0	330	330
2-METHYLNAPHTHALENE	<330	ug/Kg	1.0	330	330
ACENAPHTHYLENE	<330	ug/Kg	1.0	330	330
ACENAPHTHENE	<330	ug/Kg	1.0	330	330
FLUORENE	<330	ug/Kg	1.0	330	330
PHENANTHRENE	<330	ug/Kg	1.0	330	330
ANTHRACENE	<330	ug/Kg	1.0	330	330
FLUORANTHENE	<330	ug/Kg	1.0	330	330
PYRENE	<330	ug/Kg	1.0	330	330
BENZO[A]ANTHRACENE	<330	ug/Kg	1.0	330	330
CHRYSENE	<330	ug/Kg	1.0	330	330
BENZO[B]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[K]FLUORANTHENE	<330	ug/Kg	1.0	330	330
BENZO[A]PYRENE	<330	ug/Kg	1.0	330	330
INDENO[1,2,3-CD]PYRENE	<330	ug/Kg	1.0	330	330
DIBENZ[A,H]ANTHRACENE	<330	ug/Kg	1.0	330	330
BENZO[G,H,I]PERYLENE	<330	ug/Kg	1.0	330	330
NITROBENZENE-D5	74	%	1.0		
2-FLUOROBIPHENYL	71	%	1.0		
TERPHENYL-D14	71	%	1.0		

Report Notes:

Katahdin Analytical Services

8270 LCS Recovery Sheet

Lab File: X2090

Sample ID: LCS;060899

Date Run: 7/6/99

Analyst: KRT

Time Injected 1:10:00 PM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	1667	1370	82	60-140
ACENAPHTHENE	1667	1310	78	60-140
ACENAPHTHYLENE	1667	1280	77	60-140
ANTHRACENE	1667	1270	76	60-140
BENZO[A]ANTHRACENE	1667	1130	68	60-140
BENZO[A]PYRENE	1667	1090	65	60-140
BENZO[B]FLUORANTHENE	1667	1130	68	60-140
BENZO[G,H,I]PERYLENE	1667	934	*56	60-140
BENZO[K]FLUORANTHENE	1667	1160	70	60-140
CHRYSENE	1667	1080	65	60-140
DIBENZ[A,H]ANTHRACENE	1667	912	*55	60-140
FLUORANTHENE	1667	1320	80	60-140
FLUORENE	1667	1410	84	60-140
INDENO[1,2,3-CD]PYRENE	1667	1020	61	60-140
NAPHTHALENE	1667	1200	72	60-140
PHENANTHRENE	1667	1300	78	60-140
PYRENE	1667	1140	68	60-140

* Out of Limits

1



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ04A
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/4/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ04A	SL	-	-	6/4/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	122	%	1.0		
1,2-DICHLOROETHANE-D4	124	%	1.0		
TOLUENE-D8	113	%	1.0		
P-BROMOFLUOROBENZENE	109	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ05A
SDG: WP2729
Report Date: 7/6/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/5/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ05A	SL	-	-	6/5/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	117	%	1.0		
1,2-DICHLOROETHANE-D4	116	%	1.0		
TOLUENE-D8	114	%	1.0		
p-BROMOFLUOROBENZENE	107	%	1.0		

port Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF07A
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF07A	AQ	-	-	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	88	%	1.0		
1,2-DICHLOROETHANE-D4	80	%	1.0		
TOLUENE-D8	85	%	1.0		
P-BROMOFLUOROBENZENE	79	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKZ07A
SDG: WP2729
Report Date: 7/6/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: 100
Method: SW8260
Date Analyzed: 6/7/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKZ07A	SL	-	-	6/7/99	KRT	5030	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/Kg	1.0	5	5
TOLUENE	<5	ug/Kg	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/Kg	1.0	5	5
ETHYLBENZENE	<5	ug/Kg	1.0	5	5
NAPHTHALENE	<5	ug/Kg	1.0	5	5
MTBE	<5	ug/Kg	1.0	5	5
TOTAL XYLENES	<5	ug/Kg	1.0	5	5
DIBROMOFLUOROMETHANE	125	%	1.0		
1,2-DICHLOROETHANE-D4	130	%	1.0		
TOLUENE-D8	105	%	1.0		
BROMOFLUOROBENZENE	99	%	1.0		

Port Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z0972

Sample ID: LCSZ04A

Date Run: 6/4/99

Analyst: KMC

Time Injected 9:27:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	58.3	116	60-140
BENZENE	50	54.8	110	60-140
ETHYLBENZENE	50	65.9	132	60-140
MTBE	50	56.5	113	60-140
NAPHTHALENE	50	50.5	101	60-140
TOLUENE	50	59.1	118	60-140
TOTAL XYLENES	150	202	135	60-140

*** Out of Limits**

1

1000272

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z0988

Sample ID: LCSZ05A

Date Run: 6/5/99

Analyst: JSS

Time Injected 11:30:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.9	100	60-140
BENZENE	50	48.3	97	60-140
ETHYLBENZENE	50	55.2	110	60-140
MTBE	50	52.5	105	60-140
NAPHTHALENE	50	45.8	92	60-140
TOLUENE	50	49.2	98	60-140
TOTAL XYLENES	150	165	110	60-140

*** Out of Limits**

1

1000278

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F0796

Sample ID: LCSF07A

Date Run: 6/7/99

Analyst: KRT

Time Injected 10:00:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	46.3	92	60-140
BENZENE	50	47.2	94	60-140
ETHYLBENZENE	50	47.9	96	60-140
MTBE	50	45.7	91	60-140
NAPHTHALENE	50	46.8	94	60-140
TOLUENE	50	47.1	94	60-140
TOTAL XYLENES	150	141	94	60-140

*** Out of Limits**

1

1000284

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: Z1004

Sample ID: LCSZ07A

Date Run: 6/7/99

Analyst: KRT

Time Injected 9:18:00 AM

Matrix: SL

Compound Name	Spike Amt (ug/Kg)	Result (ug/Kg)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	49.5	99	60-140
BENZENE	50	48.2	96	60-140
ETHYLBENZENE	50	56.5	113	60-140
MTBE	50	44.9	90	60-140
NAPHTHALENE	50	35.6	71	60-140
TOLUENE	50	51.3	102	60-140
TOTAL XYLENES	150	172	114	60-140

*** Out of Limits**

1

Case Narrative for
KATA
SDG# 96058S

TOTAL PETROLEUM HYDROCARBONS

Analytical Batch Number: 151686

Analytical Method: SW846 9071A

<u>Laboratory Number</u>	<u>Sample Description</u>
9906097-01	14SLB020203
9906097-02	14SLB020203D
9906097-05	15SLB020405
9906097-06	15SLB020405D
9906097-07	29SLB050809
QC621595	Blank
QC621596	Laboratory Control Sample
QC621597	Matrix Spike of 9906097-01
QC621598	Duplicate of 9906097-01
QC621599	Matrix Spike of 9906242-01
QC621600	Duplicate of 9906242-01

Instrument Calibration:

The instrument was properly calibrated.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The matrix spikes were run on the following Sample Numbers.

9906097-01 and 9906242-01

All analyte recoveries in the matrix spikes were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

TOTAL ORGANIC CARBON

Analytical Batch Number: 150724

Analytical Method: SW846 9060 Modified

<u>Laboratory Number</u>	<u>Sample Description</u>
9906058-01	29SLB060809
9906097-03	14SLB050304
9906097-04	15SLB010405
QC617934	Blank
QC617935	Duplicate of 9906058-01
QC617936	Post Spike of 9906058-01
QC617937	Laboratory Control Sample

Sample Preparation:

All samples were prepared in accordance with accepted procedures. The method quoted is only for liquid samples. It is modified to handle soils analysis.

Instrument Calibration:

The instrument used was a Dohrmann DC-190 high temperature combustion TOC analyzer with a Dohrmann solids boat sampler. The instrument was properly calibrated on the day of the analysis.

Holding Time:

All samples were analyzed within the required holding time.

Blanks:

No target analytes were detected in the method blank above the required acceptance limit.

Spike Analyses:

The post spike was run on the following Sample Number.

9906058-01

All analyte recoveries in the post spike were within the required acceptance limits.

Laboratory Control Samples:

All analyte recoveries in the laboratory control sample were within the required acceptance limits.

Sample Duplicates:

All sample duplicate results were within the required acceptance limits.

Dilutions:

None of the samples were diluted.

Non Conformance Reports:

There were no Nonconformance Reports associated with this batch.

Additional Comments:

TOC solid samples are are tested to determine if inorganic carbon such as carbonates and bicarbonates are present in the sample. If so, the sample is acidified to remove the inorganic carbon, then dried in a low temperature oven. Because the sample portion is dried before analysis, the percent moisture correction is not applied to the TOC solid result.

The preceding narratives have been reviewed by:  Date: 06/27/99

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(803) 556-8171

99060587.

[illegible]

White .mple collector **Yellow** = file **Pink** = with report

9906097%

[illegible]

White = sample collector Yellow = file Pink = with report

FEDERAL SAMPLE RECEIPT REVIEW

Client KATA

Received by SA

Date 6/2/99

GEL COOLER ☒ GEL POLY COOLER ☐ CLIENT COOLER ☐ OTHER ☐

SAMPLE REVIEW CRITERIA		YES	NO	COMMENTS/QUALIFIERS
1.	Were shipping containers received intact and sealed? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2.	Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Were the survey results negative? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3.	Were chain of custody documents included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.	Were chain of custody documents completed correctly? (Ink, signed, match containers)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Were all sample containers properly labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.	Were proper sample containers received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.	Preserved samples checked for pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.	Were samples preserved correctly? If no, list samples & tests	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9.	Shipping container temperature checked?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10.	Was shipping container temperature within specifications ($4^{\circ} \pm 2^{\circ} \text{C}$)? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4°C
11.	Is temperature documented on the Chain of Custody?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12.	Were samples received within holding time? if No, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13.	Were VOA vials free of headspace?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14.	ARCO# IF REQUIRED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15.	SDG# IF REQUIRED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

REVIEW Francis DATE 6/2/99

SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

FEDERAL SAMPLE RECEIPT REVIEW

Client KATA

Received by CG

Date 6/2/99

GEL COOLER ☐ GEL POLY COOLER ☐ CLIENT COOLER ☒ OTHER ☐

SAMPLE REVIEW CRITERIA		YES	NO	COMMENTS/QUALIFIERS
1.	Were shipping containers received intact and sealed? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2.	Was the Shipment screened following the radiochemistry survey procedure (EPI SOP S-007)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Were the survey results negative? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Are any of the samples identified by the client as radioactive? If yes, did client provide RAD activity?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3.	Were chain of custody documents included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.	Were chain of custody documents completed correctly? (Ink, signed, match containers)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Were all sample containers properly labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.	Were proper sample containers received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.	Preserved samples checked for pH?	<input type="checkbox"/>	<input type="checkbox"/>	
8.	Were samples preserved correctly? If no, list samples & tests	<input type="checkbox"/>	<input type="checkbox"/>	Soil
9.	Shipping container temperature checked?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10.	Was shipping container temperature within specifications ($4^{\circ} \pm 2^{\circ} \text{C}$)? If no, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4°C
11.	Is temperature documented on the Chain of Custody?	<input type="checkbox"/>	<input type="checkbox"/>	
12.	Were samples received within holding time? if No, notify Project Manager	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13.	Were VOA vials free of headspace?	<input type="checkbox"/>	<input type="checkbox"/>	
14.	ARCO# IF REQUIRED	<input type="checkbox"/>	<input type="checkbox"/>	
15.	SDG# IF REQUIRED	<input checked="" type="checkbox"/>	<input type="checkbox"/>	96097

REVIEW Francis DATE 6/2/99 SA - SEALS ATTACHED NSA - NO SEALS ATTACHED

S.W.COLE

ENGINEERING, INC.
GEOTECHNICAL CONSULTANTS

Gray Plaza, P. O. Box 378, Gray, ME 04039 TEL (207) 657-2866 FAX (207) 657-2840

Six Liberty Drive, Bangor, ME 04401 TEL (207) 848-5714 FAX (207) 848-
91 Water St., P. O. Box 220, Caribou, ME 04736 TEL (207) 496-1511 FAX (207) 496-
33 Londonderry Rd., #6, Londonderry, NH 03053 TEL (603) 437-9600 FAX (603) 437-9656

Letter Of Transmittal

To: Katahdin Analytical
Attn: Kelly Perkins
P.O. Box 720
Westbrook, ME 04098

Date: June 11, 1999
Project No: 99-008
Subject: Misc. Testing '99

We are sending you: ☐ Attached ☐ Under separate cover
☐ Investigation Report ☐ Prints ☐ Samples
☐ Laboratory Test Report(s) ☐ Copy of Letter(s) ☐ Invoice
☐ Field Test Report(s) ☐ Specifications ☐ Other

Description:	Report of Gradation S # 19-20 Hydrometer Analysis S # 19-20
---------------------	----------------------------------------------------------------


These are transmitted as checked below:

☒ For your information ☒ For your use
☒ As requested ☐ Returned

Remarks:

Copy to:

S. W. COLE ENGINEERING, INC.

BY: 
Roger E. Domingo

Client: Katahdin Analytical
340 County Road
Westbrook, Maine 04092
Contact: Ms. Andrea Colby
Project Description: Former Naval Complex

cc: KATA00199

Report Date: June 22, 1999

Page 1 of 1

Sample ID : 14SLB020203
Lab ID : 9906097-01
Matrix : Soil
Date Collected : 06/02/99
Date Received : 06/02/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		785	66.0	132	mg/kg	1.0	AAT	06/22/99	0950	151686	1
Evaporative Loss @ 105 C		24.0	1.00	1.00	wt%	1.0	GI	06/03/99	1500	150650	2

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

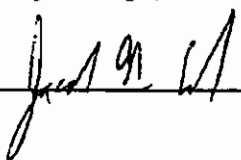
U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By



Client: Katahdin Analytical
340 County Road
Westbrook, Maine 04092
Contact: Ms. Andrea Colby
Project Description: Former Naval Complex

cc: KATA00199

Report Date: June 22, 1999

Page 1 of 1

Sample ID : 14SLB020203D
Lab ID : 9906097-02
Matrix : Soil
Date Collected : 06/02/99
Date Received : 06/02/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		321	59.5	119	mg/kg	1.0	AAT	06/22/99	0950	151686	1
Evaporative Loss @ 105 C		16.0	1.00	1.00	w1%	1.0	GJ	06/03/99	1500	150650	2

M = Method	Method-Description
M 1	SW846 9071A
M 2	EPA 3550

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

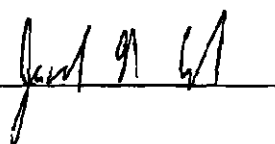
U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By



4006007 000

Client: Katahdin Analytical
340 County Road
Westbrook, Maine 04092
Contact: Ms. Andrea Colby
Project Description: Former Naval Complex

cc: KATA00199

Report Date: June 22, 1999

Page 1 of 1

Sample ID : 14SLB050304
Lab ID : 9906097-03
Matrix : Soil
Date Collected : 06/02/99
Date Received : 06/02/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		13.0	1.00	1.00	wt%	1.0	GJ	06/03/99	1500	150650	1
Total Organic Carbon		11900	43.1	100	mg/kg	1.0	LS	06/18/99	1836	150724	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 Modified

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

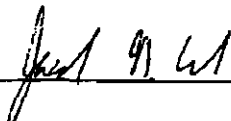
U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By



9906097-03

QC Summary Report

Project Description: Former Naval Complex

cc: KATA00199

Lab. Sample ID: 9906097%

Report Date: June 22, 1999

Page 1 of 1

Sample/Parameter	Type	Batch	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analyst	Date	Time
General Chemistry													
QC621595	BLANK	151686											
Total Rec. Petro. Hydrocarbons						0.00	mg/kg				AAT	06/22/99	0950
QC621598	9906097-01DUP	151686											
Total Rec. Petro. Hydrocarbons				783		1020	mg/kg	26.3					
QC621600	9906242-01DUP	151686											
Total Rec. Petro. Hydrocarbons				1560		1910	mg/kg	20.0					
QC621596	LCS	151686											
Total Rec. Petro. Hydrocarbons			11000			9840	mg/kg		89.6	(70.0 - 116.)			
QC621597	9906097-01MS	151686											
Total Rec. Petro. Hydrocarbons			13200	783		12600	mg/kg		90.0	(70.0 - 130.)			
QC621599	9906242-01MS	151686											
Total Rec. Petro. Hydrocarbons			12100	1560		13000	mg/kg		94.6	(70.0 - 130.)			
QC617634	BLANK	150650											
Evaporative Loss @ 105 C						0.00	wt%				GJ	06/03/99	1500
QC617632	9906058-01DUP	150650											
Evaporative Loss @ 105 C				8.00		8.00	wt%	0.00					
QC617934	BLANK	150724											
Total Organic Carbon						-2.83	mg/kg				LS	06/18/99	1628
QC617935	9906058-01DUP	150724											
Total Organic Carbon				6780		6830	mg/kg	0.764			LS	06/18/99	1740
QC617937	LCS	150724											
Total Organic Carbon			3750			4420	mg/kg		118	(88.0 - 130.)	LS	06/18/99	1612
QC617936	9906058-01PS	150724											
Total Organic Carbon			10000	6780		16200	mg/kg		94.2	(73.0 - 129.)	LS	06/18/99	1747

Notes:

The qualifiers in this report are defined as follows:

J indicates presence of analyte < RL (Report Limit)

U indicates presence of analyte < DL (Detect Limit)

n/a indicates that spike recovery limits do not apply when
sample concentration exceeds spike conc by a factor of 4 or more

S. W. COLE ENGINEERING, INC.

R E P O R T O F G R A D A T I O N
ASTM C-117, C-136

Project No. 99008
Date 06/07/1999

Project MISCELLANEOUS
Client KATAHDIN ANALYTICAL
Sample No. 19, SANDY GRAVEL, WP2729-6

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT</u> <u>Specifications %</u>
3/4 "	100.0	
1/2 "	96.9	
1/4 "	91.1	
# 4	88.6	
# 10	77.6	
# 20	62.7	
# 40	51.8	
# 60	44.0	
# 100	27.7	
# 200	10.4	

S. W. COLE ENGINEERING, INC.

R E P O R T O F G R A D A T I O N
ASTM C-117, C-136

Project No. 99008
Date 06/07/1999

Project MISCELLANEOUS
Client KATAHDIN ANALYTICAL
Sample No. 20, SAND, WP2729-7

<u>Sieve Size</u>	<u>Percent Passing</u>	<u>PROJECT</u> <u>Specifications %</u>
1/2 "	100.0	
1/4 "	99.7	
# 4	99.5	
# 10	98.3	
# 20	95.8	
# 40	90.4	
# 60	78.0	
# 100	29.8	
# 200	6.8	

HYDROMETER ANALYSIS

JOB NO.99-008

BORING NO.

SAMPLE NO.S-19

DIAMETER	% PASSING	READING
3.652952E-02	10.13329	2.2
2.587339E-02	9.479344	2
1.831047E-02	9.152371	1.9
1.339429E-02	8.49881	1.7
9.471192E-03	8.49881	1.7
.0067193	7.190912	1.3
4.762978E-03	6.210377	1
3.387185E-03	3.921943	.3
2.398976E-03	3.267994	.1
1.380011E-03	4.739186	.55

HYDROMETER ANALYSIS

JOB NO.99008

BORING NO.

SAMPLE NO.S-20

DIAMETER	% PASSING	READING
3.748418E-02	5.39373	2
2.654942E-02	4.944107	1.8
1.881995E-02	4.269942	1.5
1.374415E-02	4.269942	1.5
9.750622E-03	3.370696	1.1
6.92858E-03	2.022096	.5
4.919103E-03	.8983074	0

August 17, 1999

Mr. Paul Calligan
Tetra Tech NUS
1401 Oven Park Drive, Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP-3254
Project ID: CTO #68
Project Manager: Ms. Andrea J. Colby
Sample Receipt Date: July 14, 1999

Dear Mr. Calligan:

Please find enclosed the following information:

- * Report of Analysis
- * Quality Control Data Summary
- * Confirmation
- * Chain of Custody

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES

Maria Crouch
Authorized Signature

08/17/99
Date

TECHNICAL NARRATIVE

Volatile Organics Analysis

Four aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on July 14, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-S instrument. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ug/l.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate was performed on any sample in this workorder.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Method 8260B narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 14.0%, making the curve acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organics Extraction and Analysis

Three aqueous samples were received by Katahdin Analytical Services laboratory on July 14, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of the samples occurred following USEPA method 3510 on July 15, 1999. A laboratory control spike consisting of all PAH analytes spiked into organic free water, was extracted in the batch, along with a site specific MS/MSD pair on sample WP3254-2.

The initial calibration curve analyzed in this SDG had some of the target analyte %RSD values exceeding 15 %.

Method 8000B, section 7.5.1.2.1 (Revision 2, 12/96) states, "in those instances where the RSD for one or more analytes exceeds 20%, the initial calibration curve may still be acceptable if the mean of the RSD values for all analytes in the calibration is less than or equal to 20%." Section 7.3.7.1 of method 8270C (revision 3, 12/96) narrows this 20% maximum to 15%.

In the calibration curve analyzed in this SDG, the average %RSD for all analytes was 10.1%, making the curve acceptable.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

KATAHDIN ANALYTICAL SERVICES, INC.

SAMPLE RECEIPT CONDITION REPORT

Tel. (207) 874-2400

Fax (207) 775-4029

LAB (WORK ORDER) # WP 3254PAGE: 1 OF 1COOLER: 1 OF 1COC# —SDG# —DATE / TIME RECEIVED: 7-14-99 0930DELIVERED BY: FedExRECEIVED BY: SanLIMS ENTRY BY: AJCLIMS REVIEW BY / PM: AJCCLIENT: Tetra TechPROJECT: Charleston

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION		
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.5</u>			
6. SAMPLES RECEIVED AT 4°C ± 2° (C) ICE PACKS PRESENT (Y or N)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)			
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A				
13. ANALYTICAL PROGRAMS (CIRCLE ONE)	COMMERCIAL	CLP	HAZWRAP	<u>NFESC</u>	ACOE	AFCEE	OTHER (STATE OF ORIGIN):

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check required. If samples required pH adjustment, record volume and type of preservative used.

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 1

ORDER NO WP-3254

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 07/14/99
PHONE: 850/385-98
FAX: 850/385-98
DUE: 13 AUG
FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 12 SEP

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3254-1	14GLM0101	13 JUL 1255	14 JUL	AQ
	WP3254-2	15GLM0101	13 JUL 1050		
	WP3254-3	34GLM0101	13 JUL 0858		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
TOTALS		3	200.00	600.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WP3254-4	34TL00201	13 JUL	14 JUL	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	1	75.00	75.00

ORDER NOTE: QC-IV NFESC
DD(KAS007QC-DB3)
CNC CHARLESTON
REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220
REPORT & DISK

FINAL PAGE

INVOICE: With Report

TOTAL ORDER AMOUNT \$675.00
This is NOT an Invoice

AJC/WEST.AJC(dw)

07-14 Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questions

00000021



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note

Note Text

Report Note	Note Text
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3254-1
SDG: WP3254
Report Date: 8/11/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 8/2/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0101	AQ	7/13/99	7/14/99	7/15/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	65	%	1.0		
2-FLUOROBIPHENYL	65	%	1.0		
TERPHENYL-D14	70	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3254-1
SDG: WP3254
Report Date: 8/11/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/19/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0101	AQ	7/13/99	7/14/99	7/19/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	115	%	1.0		
1,2-DICHLOROETHANE-D4	113	%	1.0		
OLUENE-D8	110	%	1.0		
P-BROMOFLUOROBENZENE	98	%	1.0		

Report Notes:

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;071599

Lab Name: Katahdin Analytical Services

SDG No.: WP3254

Lab File ID: Z1577

Lab Sample ID: SBLK;071599

Instrument ID: 5972-Z

Date Extracted: 7/15/99

GC Column: RTX-624 ID: 0.18 (mm)

Date Analyzed: 07/30/99

Matrix: (soil/water) WATER

Time Analyzed: 15:18

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;071599	LCS;071599	Z1592	8/2/99	11:15:00 AM
14GLM0101	WP3254-1	Z1597	8/2/99	3:18:00 PM
15GLM0101	WP3254-2	Z1598	8/2/99	4:06:00 PM
34GLM0101	WP3254-3	Z1599	8/2/99	4:53:00 PM
15GLM0101MS	WP3254-2MS	Z1609	8/3/99	12:13:00 PM
15GLM0101MSD	WP3254-2MSD	Z1610	8/3/99	1:00:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: SBLK:071599
SDG: WP3254
Report Date: 8/11/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 7/30/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK:071599	AQ	-	-	7/15/99	DPD	EPA 3510	KRT

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	62	%	1.0		
2-FLUOROBIPHENYL	64	%	1.0		
TERPHENYL-D14	74	%	1.0		

Report Notes:

Katahdin Analytical Services

8270 LCS Recovery Sheet

Lab File: Z1592

Sample ID: LCS;071599

Date Run: 8/2/99

Analyst: KRT

Time Injected 11:15:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	23.2	*46	70-130
ACENAPHTHENE	50	28.9	*58	70-130
ACENAPHTHYLENE	50	27.9	*56	70-130
ANTHRACENE	50	41.4	83	70-130
BENZO[A]ANTHRACENE	50	37.5	75	70-130
BENZO[A]PYRENE	50	35.9	72	70-130
BENZO[B]FLUORANTHENE	50	35.3	70	70-130
BENZO[G,H,I]PERYLENE	50	35.0	70	70-130
BENZO[K]FLUORANTHENE	50	38.1	76	70-130
CHRYSENE	50	39.6	79	70-130
DIBENZ[A,H]ANTHRACENE	50	35.1	70	70-130
FLUORANTHENE	50	43.5	87	70-130
FLUORENE	50	33.5	*67	70-130
INDENO[1,2,3-CD]PYRENE	50	37.3	75	70-130
NAPHTHALENE	50	19.7	*39	70-130
PHENANTHRENE	50	38.3	77	70-130
PYRENE	50	33.8	*68	70-130

* Out of Limits

1

0000014

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3254-2	Z1598	8/2/99	4:06:00 PM	KRT	AQ	8270_99
WP3254-2MS	Z1609	8/3/99	12:13:00 PM	KRT	AQ	8270_99
WP3254-2MSD	Z1610	8/3/99	1:00:00 PM	KRT	AQ	8270_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	50	50	76.7	78.3	*153	*156	60-140	2.1	30
ACENAPHTHENE	0	50	50	71.0	67.2	*142	134	60-140	5.5	30
ACENAPHTHYLENE	0	50	50	67.5	64.1	135	128	60-140	5.2	30
ANTHRACENE	0	50	50	79.9	83.0	*160	*166	60-140	3.8	30
BENZO[A]ANTHRACENE	0	50	50	71.3	74.1	*143	*148	60-140	3.8	30
BENZO[A]PYRENE	0	50	50	69.6	69.9	139	140	60-140	0.43	30
BENZO[B]FLUORANTHENE	0	50	50	65.0	67.0	130	134	60-140	3.0	30
2-METHYLNAPHTHALENE	0	50	50	68.4	57.6	137	115	60-140	17	30
BENZO[K]FLUORANTHENE	0	50	50	83.3	78.5	*167	*157	60-140	5.9	30
PYRENE	0	50	50	71.8	79.4	*144	*159	60-140	10	30
DIBENZ[A,H]ANTHRACENE	0	50	50	60.0	66.6	120	133	60-140	10	30
FLUORANTHENE	0	50	50	78.6	77.4	*157	*155	60-140	1.5	30
FLUORENE	0	50	50	69.6	69.7	139	139	60-140	0.14	30
INDENO[1,2,3-CD]PYRENE	0	50	50	60.1	69.5	120	139	60-140	14	30
1-METHYLNAPHTHALENE	0	50	50	67.9	56.7	136	113	60-140	18	30
1-ANTHRENE	0	50	50	77.1	79.4	*154	*159	60-140	2.9	30
BENZO[G,H,I]PERYLENE	0	50	50	67.6	79.0	135	*158	60-140	16	30

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBKKS19A

Lab Name: Katahdin Analytical Services

SDG No.: WP3254

Lab File ID: S5474

Lab Sample ID: VBKKS19A

Date Analyzed: 07/19/99

Time Analyzed: 10:09

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5972-S

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSS19A	LCSS19A	S5473	7/19/99	9:09:00 AM
14GLM0101	WP3254-1	S5475	7/19/99	11:03:00 AM
15GLM0101	WP3254-2	S5476	7/19/99	11:45:00 AM
34GLM0101	WP3254-3	S5477	7/19/99	12:27:00 PM
34TL00201	WP3254-4	S5478	7/19/99	1:10:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: VBLKS19A
SDG: WP3254
Report Date: 8/11/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 7/19/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKS19A	AQ	-	-	7/19/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	110	%	1.0		
1,2-DICHLOROETHANE-D4	106	%	1.0		
TOLUENE-D8	102	%	1.0		
P-BROMOFLUOROBENZENE	97	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: S5473

Sample ID: LCSS19A

Date Run: 7/19/99

Analyst: KMC

Time Injected 9:09:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	53.2	106	60-140
BENZENE	50	53.1	106	60-140
ETHYLBENZENE	50	61.1	122	60-140
MTBE	50	53.2	106	60-140
NAPHTHALENE	50	56.3	112	60-140
TOLUENE	50	54.4	109	60-140
TOTAL XYLENES	150	189	126	60-140

* Out of Limits

1

0000018



October 12, 1999

Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

RE: Katahdin Lab Number: WP-3877
Project ID: CTO #68
Project Manager: Ms. Andrea J. Colby
Sample Receipt Date: September 10, 1999

Dear Mr. Calligan:

Please find enclosed the following information:

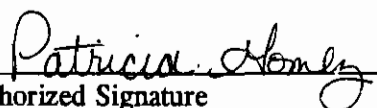
- * Report of Analysis
- * Quality Control Data
- * Confirmation
- * Chain of Custody

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES


Authorized Signature

10/12/99
Date

**SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS
CASE CNC CHARLESTON**

Sample Receipt

The following samples were received on September 10, 1999 and were logged in under Katahdin Analytical Services work order number WP3877 for a hardcopy due date of October 10, 1999. The methane samples were canceled by Paul Calligan when it was discovered that FEDEX has misdelivered the cooler and the samples were out of hold time by the time they were received by the subcontract lab.

<u>KATAHDIN</u> <u>Sample No.</u>	<u>TTNUS</u> <u>Sample Identification</u>
WP3877-1	34GLM0101
WP3877-2	34GLM0201
WP3877-3	34GLM0301
WP3877-4	34GLM0201D
WP3877-5	14GLM0301D
WP3877-6	34TL00201
WP3877-7	14TL00201
WP3877-8	18TL00101
WP3877-9	23TL00101
WP3877-10	14GLM0101
WP3877-11	14GLM0201
WP3877-12	14GLM0301
WP3877-13	19GLO1B01
WP3877-14	19GLM0301
WP3877-15	19GLM0601
WP3877-16	19GLO1D01
WP3877-17	19GLO1C01
WP3877-18	18GLO1F01
WP3877-19	18GLM03D01
WP3877-20	18GLM0201
WP3877-21	18GLM0201D
WP3877-22	18GLO1E01
WP3877-23	18GLM0101
WP3877-24	23GLM0201
WP3877-25	23GLX0201
WP3877-26	23GLM0301

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Volatile Organic Analysis

Twenty-four aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on September 10, 1999 and were specified to be analyzed by USEPA method 8260B for the analytes benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, and EDB.

Analyses for this workorder were performed on the 5972-F instrument. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

Batch QC (VBLK, and LCS) was performed in each twelve-hour window. Results are included in this data package. The LCS QC samples were spiked with the entire list of compounds quantitated for at 50 ppb. A matrix spike/matrix spike duplicate analysis was performed on sample WP3877-20.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Semivolatile Organic Analysis

Twenty aqueous samples were received by Katahdin Analytical Services laboratory on September 10, 1999 for analysis in accordance with 8270C for a client specified PAH list of analytes.

Extraction of samples WP3877 2-5, -11-19 occurred following USEPA method 3510 on September 13, 1999. A laboratory control spike/laboratory control spike duplicate pair was extracted in the batch. The remainder of the samples. WP3877 20-26 were extracted following USEPA method 3510 on September 14, 1999. A laboratory control sample, along with a site specific MS/MSD pair on sample WP3877-20, was extracted in this batch.

Analysis of sample WP3877-21 yielded concentrations of the analytes acenaphthene and 2-methylnaphthalene over the upper limit of the calibration curve. Reanalysis occurred at a 1:2 dilution successfully. Both sets of data for this sample are included in this data package.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

Metals Analysis

The samples of Katahdin Work Order WP3877 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Waste", SW-846, November 1986, Third Edition.

Inductively-Coupled Plasma (ICP) Atomic Emission Spectroscopic Analysis

Aqueous-matrix Katahdin Sample Nos. WP3877-(18-26) were initially digested for ICP analysis on 09/16/99 (QC Batch PI16ICW0) in accordance with USEPA Method 3010A. Katahdin Sample No. WP3877-20 was prepared with duplicate matrix-spiked aliquots in this digestion. The sodium (101 ug/L) concentration of the preparation blank that is associated with this QC batch exceeds the laboratory's acceptance limit. Because the measured sodium concentration of all associated sample were more than ten times that of the preparation blank, no corrective action was taken. The digestates of QC Batch PI16ICW0 were consumed before they could be analyzed for antimony, arsenic, lead, selenium, thallium, or zinc. For this reason, Katahdin Sample Nos. WP3877-(18-26) were redigested on 09/22/99 (QC Batch PI22ICW0) and 09/23/99 (QC Batch PI23ICW0) to provide additional digestate for further analysis. Redigestates are identified throughout the accompanying forms and raw data by the suffix "R" appended to the Katahdin Sample No., e.g. "WP3877-018R". Due to laboratory error, none of these samples were redigested with matrix-spiked aliquots, so there are no matrix QC data for antimony, arsenic, lead, selenium or thallium.

ICP analyses of Katahdin Work Order WP3877 sample digestates were performed in accordance with USEPA Method 6010B, using a Thermo Jarrell Ash (TJA) Trace ICP spectrometer and a TJA 61 ICP spectrometer. All samples were analyzed within holding times and all QC criteria were met with the following comments or exceptions:

Some of the results for run QC samples (ICV, ICB, CCV, CCB, ICSA, and ICSAB) included in the accompanying data package may have exceeded acceptance limits for some elements. Please note that all client samples and batch QC samples associated with out-of-control results for run QC samples were subsequently reanalyzed for the analytes in question.

Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrophotometry

Aqueous-matrix Katahdin Sample Nos. WP3877-(18-23) were digested for mercury analysis on 09/14/99 (QC Batch PI14HGW0) in accordance with USEPA Method 7470A. Due to laboratory error, none of these samples were digested with matrix-spiked aliquots, so there are no matrix QC data for mercury.

Mercury analyses of Katahdin Work Order WP3877 sample digestates were performed using a Leeman Labs PS200 automated mercury analyzer. All samples were analyzed within holding times and all run QC criteria were met.

Wet Chemistry Analysis

Due to IC instrument failure, alternate methods were approved by Kelly Johnson-Carper for the analysis of nitrate and sulfate.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3877

PAGE: 2 OF 6

COOLER: 2 OF 4

COC# -

SDG# -

DATE / TIME RECEIVED: 09-10-99 ~ 1000

DELIVERED BY: FEDEx

RECEIVED BY: BKR

LIMS ENTRY BY: ASC

LIMS REVIEW BY / PM: ASC

CLIENT: T. Aratedi

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>1.1</u>	ASC notified Paul Calligan 9/13/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT <u>Y</u> or <u>N</u> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
8. TRIP BLANK PRESENT IN THIS COOLER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3877

PAGE: 3 OF 6

COOLER: 3 OF 6

COC# -

SDG# -

DATE / TIME RECEIVED: 09-10-99 ~ 1000

DELIVERED BY: FEDSY

RECEIVED BY: BKR

LIMS ENTRY BY: ASC

LIMS REVIEW BY / PM: ASC

CLIENT: Istratedh

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>3.5</u>	
6. SAMPLES RECEIVED AT 4°C +/- 2°?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
ICE / ICE PACKS PRESENT (Y) or N?				(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>NFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG - IN NOTES⁽¹⁾: On some of the 14... containers: COC (+ most bottles) have 14GLM..., a few bottles have 14GLW... (all times, dates, parameters match)

⁽¹⁾ Use this and additional sheets if necessary) to document samples that are received broken, check if required. If samples required pH adjustment, record volume and type of preservative added.

Compromised, C-O-C discrepancies, radiation checks, residual chlorine check, res

pH

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP3877

PAGE: 4 OF 6

COOLER: 4 OF 6

COC#
SDG#

DATE / TIME RECEIVED: 09-10-99 ~ 1000

DELIVERED BY: FEDSA

RECEIVED BY: BKL

LIMS ENTRY BY: ATC

LIMS REVIEW BY / PM: ATC

CLIENT: TETRAZOL

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>1.5</u>	ATC notified Paul Calinga - 9/15/99
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT <u>Y</u> or <u>N</u> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u> (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES ⁽¹⁾ : Diss Meth sent for 19GL01B01 but not on COC	1 of 2 PAH bottles 18GLM0101 arrived broken on COC, 19GL01B01 has anions listed but no containers sent " " 19GL01B01 does not list anions, but bottle sent for anions 1 of 3 voc vials for 19GLM0601 arrived broken	* On chain: 18GLM03D01, on all bottles: 18GLM0301 HNO ₃ added to metals for: 18GLM0301, 18GLM0201, 18GLM0201B, 18GL01E01, 18GLM0101
--------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

0000101

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # WP 3877

PAGE: 5 OF 6

COOLER: 5 OF 6

COC# -

SDG# -

DATE / TIME RECEIVED: 09-10-99 ~ 1000

DELIVERED BY: DEDEY

RECEIVED BY: BREY

LIMS ENTRY BY: AX

LIMS REVIEW BY / PM: AD

CLIENT: Tetradich

PROJECT: CNC CHARLESTON

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. TEMPERATURE BLANKS PRESENT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TEMP BLANK TEMP (°C) = <u>4.9</u>	
6. SAMPLES RECEIVED AT 4°C ± 2?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	COOLER TEMP (°C) = <u>NA</u>	
ICE ICE PACKS PRESENT Y or N?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
8. TRIP BLANK PRESENT IN THIS COOLER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
12. CORRECTIVE ACTION REPORT FILED?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A		
13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP <u>MFESC</u> ACOE AFCEE OTHER (STATE OF ORIGIN):					

LOG-IN NOTES⁽¹⁾: 23GLM0201 Diss. Methane vaa (1 of 3) has headspace -- a bunch of small bubbles (maybe pea size total)
23GLX0201 Added HNO₃ to Pb container to ↓ pH to <2

⁽¹⁾ Use this and additional sheets if necessary to document samples that are received broken, compromised, C-O-C discrepancies, radiation checks, residual chlorine check, residual pH check if re J. If samples required pH adjustment, record volume and type of preservative added.

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) # ASP 3877

PAGE: 6 OF 6

COOLER: 6 OF 6

COC# -

SDG# -

DATE / TIME RECEIVED: 09-10-99 ~ 1000

DELIVERED BY: FEDEX

RECEIVED BY: BKR

LIMS ENTRY BY: ADC

LIMS REVIEW BY / PM: ADC

CLIENT: Tetratedu

PROJECT: CNC CHARLESTON

Wm

- | | YES | NO | EXCEPTIONS |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| 1. CUSTODY SEALS PRESENT / INTACT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. CHAIN OF CUSTODY PRESENT IN THIS COOLER? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. CHAIN OF CUSTODY SIGNED BY CLIENT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. CHAIN OF CUSTODY MATCHES SAMPLES? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. TEMPERATURE BLANKS PRESENT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. SAMPLES RECEIVED AT 4°C ± 2?
ICE / ICE PACKS PRESENT Y or N? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. VOLATILES FREE OF HEADSPACE? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. TRIP BLANK PRESENT IN THIS COOLER | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 9. PROPER SAMPLE CONTAINERS AND VOLUME? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. SAMPLES WITHIN HOLD TIME UPON RECEIPT? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. SAMPLES PROPERLY PRESERVED ⁽¹⁾ ? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. CORRECTIVE ACTION REPORT FILED? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A |

COMMENTS

RESOLUTION

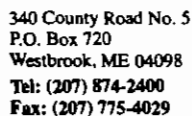
TEMP BLANK TEMP (°C) = 0.8 ADC notified Vanel Catligan 9/10/99

COOLER TEMP (°C) = NA
(RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)

13. ANALYTICAL PROGRAMS (CIRCLE ONE) COMMERCIAL CLP HAZWRAP NFESC ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES⁽¹⁾:

⁽¹⁾ Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.



PLEASE PRINT IN PEN

Page 1 of 1

Relinquished By: (Signature) <i>[Signature]</i>	Date / Time 4/9/99 1900	Received By: (Signature) <i>Felix 81.34573800</i>	Relinquished By: (Signature) <i>[Signature]</i>	Date / Time 4-10-99 1000	Received By: (Signature) <i>[Signature]</i>
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)



340 County Road No. 5
P.O. Box 720
Westbrook, ME 04098
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page ____ of ____

Client: **TTPA TECH NUS** Contact: **PAUL CALLAGHAN** Phone #: **(850) 385-9899** Fax #: **(850) 356-9860**
Address: **1401 CIVEN PARK DR. 102** City: **TALLAHASSEE** State: **FL** Zip Code: _____
Purchase Order #: _____ Proj. Name / No.: _____ Katahdin Quote #: _____

Bill (if different than above): _____ Address: _____
Sampler (Print / Sign): **D. HALVERSON** Copies To: _____

LAB USE ONLY WORK ORDER #: **WP3877**
KATAHDIN PROJECT MANAGER

REMARKS: _____
SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO.: _____
TEMP °C: _____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.
	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON	YOYON
	BTEX, EDB, MTBE TOTAL NAPHTHALENE HCL	PAH	AMIONS	DISSOLVED METALS HCL	METALS HNO3									
19GL01B01	9/9/99/1046	GW	9	3	2									
19GLM0601	9/9/99/1600	GW	5	3	2									
18GL01F01	9/9/99/1510	GW	6	3	2									
19GL01D01	9/9/99/1045	GW	5	3	2	1	3							
19GLM0301	9/9/99/1059	GW	9	3	2	1	3							
19GL01C01	9/9/99/1033	GW	5	3	2									
18GLM03D01	9/9/99/1601	GW	6	3	2									
18GL01E01	9/9/99/1605	GW	10	3	2	1	3							
18GLM0201	9/9/99/1517	GW	6	3	2									
18GLM0201 D	9/9/99/0000	GW	6	3	2									
18GLM0201 M	9/9/99/1517	GW	6	3	2									
18GLM0101	9/9/99/1550	GW	10	3	2	1	3							
18TL000101	9/9/99/	TRIP BLANK												
/	/													
/	/													
/	/													

Cooler 40°F

COMMENTS: **Put on ice 4°C**

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Date / Time	Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Date / Time
[Signature]	9/9/99 1830	[Signature]	9/10/99 1000	[Signature]	9/10/99 1000	[Signature]	9/10/99 1000
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Date / Time	Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Date / Time

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 1

ORDER NO WP-3877

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 09/10/99

PHONE: 850/385-9866

FAX: 850/385-9866

DUE: 10 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 09 NOV

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WP3877-1	34GLM0101	08 SEP 1725	10 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
CANCEL ANALYSIS		1	0.00	0.00

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2 WP3877-2	34GLM0201	08 SEP 1748	10 SEP	AQ
WP3877-3	34GLM0301	08 SEP 1848		
WP3877-4	34GLM0201D	08 SEP		
WP3877-5	14GLM0301D	08 SEP		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Polynuclear Aromatic Hydrocarbons	EPA 8270	4	125.00	500.00
Volatile Organics by 8260B	SW8260	4	75.00	300.00
CANCEL ANALYSIS		4	0.00	0.00

TOTALS		4	200.00	800.00
--------	--	---	--------	--------

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
3 WP3877-6	34TL00201	08 SEP	10 SEP	AQ
WP3877-7	14TL00201	08 SEP		
WP3877-8	18TL00101	09 SEP		
WP3877-9	23TL00101	09 SEP 0800		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	4	75.00	300.00

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 2

ORDER NO WP-3877

Project Manager: Andrea J. Colby

RF RT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 09/10/99

PHONE: 850/385-9899

FAX: 850/385-9860

DUE: 10 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 09 NOV

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
4 WP3877-10	14GLM0101	08 SEP 1225	10 SEP	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Nitrate as N	353.2	1	30.00	30.00
Sulfate	375.4	1	0.00	0.00
CANCEL ANALYSIS		1	0.00	0.00

TOTALS		1	30.00	30.00
--------	--	---	-------	-------

LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
5 WP3877-11	14GLM0201	08 SEP 1430	10 SEP	AQ
WP3877-12	14GLM0301	08 SEP 1210	✓	
WP3877-16	19GLO1D01	09 SEP 1045		
WP3877-14	19GLM0301	09 SEP 1059		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Nitrate as N	353.2	4	30.00	120.00
Sulfate	375.4	4	0.00	0.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	4	125.00	500.00
Volatile Organics by 8260B	SW8260	4	75.00	300.00
CANCEL ANALYSIS		4	0.00	0.00

TOTALS		4	230.00	920.00
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LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
6 WP3877-15	19GLM0601	09 SEP 1600	10 SEP	AQ
WP3877-13	19GLO1B01	09 SEP 1040		
WP3877-17	19GLO1C01	09 SEP 1033		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00

TOTALS		3	200.00	600.00
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LABORATORY ORDER CONTINUED ON PAGE 3

00001002

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 3

ORDER NO WP-3877

Project Manager: Andrea J. Colby

REPORT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 09/10/99

PHONE: 850/385-985

FAX: 850/385-986

DUE: 10 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 09 NOV

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
7	WP3877-18	18GLO1F01	09 SEP 1510	10 SEP	AQ
	WP3877-19	18GLM03D01	09 SEP 1601		
	WP3877-20	18GLM0201	09 SEP 1517		
	WP3877-21	18GLM0201D	09 SEP 0000		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	4	75.00	300.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	4	125.00	500.00
Target Analyte List Metals, Total		4	100.00	400.00
TOTALS		4	300.00	1200.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATR.
8	WP3877-22	18GLO1E01	09 SEP 1605	10 SEP	AQ
	WP3877-23	18GLM0101	09 SEP 1550		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	2	75.00	150.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	2	125.00	250.00
Nitrate as N	353.2	2	30.00	60.00
Sulfate	375.4	2	0.00	0.00
CANCEL ANALYSIS		2	0.00	0.00
Target Analyte List Metals, Total		2	100.00	200.00
TOTALS		2	330.00	660.00

KATAHDIN ANALYTICAL SERVICES, INCORPORATED
New England-ME Laboratory (207) 874-2400
CONFIRMATION

Page 4

ORDER NO WP-3877

Project Manager: Andrea J. Colby

RT TO: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

ORDER DATE: 09/10/99

PHONE: 850/385-9899

FAX: 850/385-9860

DUE: 10 OCT

FAC.ID: CNC CHARLESTON

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090

PO: N7912-P99264

PROJECT: CTO #68

SAMPLED BY: CLIENT

DELIVERED BY: FEDEX

DISPOSE: AFTER 09 NOV

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
9	WP3877-24	23GLM0201	09 SEP 1140	10 SEP	AQ
	WP3877-25	23GLX0201	09 SEP 1350		
	WP3877-26	23GLM0301	09 SEP 1445		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Volatile Organics by 8260B	SW8260	3	75.00	225.00
Polynuclear Aromatic Hydrocarbons	EPA 8270	3	125.00	375.00
Lead, Total	200.7/6010	3	20.00	60.00
Nitrate as N	353.2	3	30.00	90.00
CANCEL ANALYSIS		3	0.00	0.00
Sulfate	375.4	3	0.00	0.00
TOTALS		3	250.00	750.00

ORDER NOTE: QC-II+ W/NARRATIVE
DD(KAS007QC-DB3)
CNC CHARLESTON
NFESC

REPORT COPY: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH, PA 15220
REPORT & DISK

VOICE: With Report

TOTAL ORDER AMOUNT \$5,260.00

This is NOT an Invoice

AJC/WEST.AJC(dw)

10-04Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

0000111
KATAHDIN



KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
E	'E' flag indicates an estimated value. The analyte was detected in the sample at a concentration greater than the standard calibration range.
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.
O-2	Sample dilution required for quantitation of one or more target analytes; therefore, standard laboratory Practical Quantitation Level (PQL) could not be achieved.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3877-5
SDG: WP3877
Report Date: 10/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0301D	AQ	9/8/99	9/10/99	9/13/99	LAP	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	66	%	1.0		
2-FLUOROBIPHENYL	65	%	1.0		
TERPHENYL-D14	65	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3877-5
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM001D	AQ	9/8/99	9/10/99	9/11/99	JSS	5030	JSS
Compound	Result	Units	DF	Sample PQL	Method PQL		
BENZENE	<5	ug/L	1.0	5	5		
TOLUENE	<5	ug/L	1.0	5	5		
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5		
ETHYLBENZENE	<5	ug/L	1.0	5	5		
NAPHTHALENE	<5	ug/L	1.0	5	5		
MTBE	<5	ug/L	1.0	5	5		
TOTAL XYLENES	<5	ug/L	1.0	5	5		
DIBROMOFLUOROMETHANE	100	%	1.0				
1,2-DICHLOROETHANE-D4	96	%	1.0				
TOLUENE-D8	88	%	1.0				
P-BROMOFLUOROBENZENE	88	%	1.0				

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3877-7
SDG: WP3877
Report Date: 10/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14TL00201	AQ	9/8/99	9/10/99	9/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	103	%	1.0		
1,1-DICHLOROETHANE-D4	95	%	1.0		
1,1-DICHLOROETHANE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	87	%	1.0		

Report Notes:



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3877-10
Report Date: 10/12/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 1 of 10

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED		
14GLM0101	Aqueous			CLIENT		09/08/99	09/10/99	
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	2.0	mg/L	1.0	1.0	300.0	09/23/99	CF	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/12/99

LJO/baeajc (dw) /msm
PI10NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3877-11
Report Date: 10/12/99
PO No. : N7912-P99264
Project : CTO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 2 of 10

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED		
14GLM0201	Aqueous			CLIENT		09/08/99	09/10/99	
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	<0.050	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	2.7	mg/L	1.0	1.0	300.0	09/23/99	CF	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/12/99

LJO/baeajc(dw)/msm
PI10NOW1
CC: MS. LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3877-11
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0201	AQ	9/8/99	9/10/99	9/13/99	LAP	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	73	%	1.0		
2-FLUOROBIPHENYL	73	%	1.0		
TERPHENYL-D14	75	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3877-11
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0201	AQ	9/8/99	9/10/99	9/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	101	%	1.0		
-DICHLOROETHANE-D4	97	%	1.0		
LUENE-D8	89	%	1.0		
P-BROMOFLUOROBENZENE	90	%	1.0		

Report Notes:

CLIENT: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr., Suite 102
Tallahassee, FL 32308

Lab Number : WP-3877-12
Report Date: 10/12/99
PO No. : N7912-P99264
Project : CIO #68

WIC#: CNC CHARLESTON

REPORT OF ANALYTICAL RESULTS

Page 3 of 10

SAMPLE DESCRIPTION	MATRIX			SAMPLED BY		SAMPLED DATE RECEIVED		
14GLMD301	Aqueous			CLIENT		09/08/99	09/10/99	
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Nitrate as N	0.072	mg/L	1.0	0.050	353.2	09/10/99	KW	
Sulfate	560.	mg/L	40	1.0	375.4	10/04/99	LT	

* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

10/12/99

LJO/baeajc (dw) /mm

PI10NOW1

CC: MS. LEE LECK

TETRA TECH NUS

FOSTER PLAZA 7

661 ANDERSEN DR.



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: WP3877-12
SDG: WP3877
Report Date: 10/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/25/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0301	AQ	9/8/99	9/10/99	9/13/99	LAP	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	74	%	1.0		
2-FLUOROBIPHENYL	73	%	1.0		
TERPHENYL-D14	80	%	1.0		

Report Notes:



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: WP3877-12
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
14GLM0301	AQ	9/8/99	9/10/99	9/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	100	%	1.0		
1,2-DICHLOROETHANE-D4	97	%	1.0		
TOLUENE-D8	88	%	1.0		
P-BROMOFLUOROBENZENE	88	%	1.0		

Report Notes:



Method Blank and Laboratory Control Sample Results

Client: Tetra Tech NUS

Work Order: WP3877

Parameter	Date of Prep	Date of Analysis	METHOD BLANK RESULTS				LABORATORY CONTROL SAMPLE RESULTS					
			Units	Concentration Measured in Blank	Acceptance Range	Practical Quantitation Level**	Units	True Value	Measured Value	Percent Recovered	Acceptance Range (%)	Acceptance Range (mg/kg)
Nitrate-Nitrogen	10-Sep-99	10-Sep-99	mg/L	< 0.050	< 0.050	0.050	mg/L	1.00	0.82	82.0	80-120	
	10-Sep-99	10-Sep-99	mg/L	< 0.050	< 0.050	0.050	mg/L	1.00	1.06	106.0	80-120	
Sulfate	23-Sep-99	23-Sep-99	mg/L	< 1.0	< 1.0	1.0	mg/L	10	10	100.0	80-120	
	24-Sep-99	24-Sep-99	mg/L	< 1.0	< 1.0	1.0	mg/L	10	10	100.0	80-120	
	04-Oct-99	04-Oct-99	mg/L	< 1.0	< 1.0	1.0	mg/L	250	223	89.2	83-112	@

** Practical quantitation level is the lowest concentration measurable for samples with normal chemical and physical composition during routine laboratory operations.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory and method specified acceptance range except as noted.

@ The laboratory uses the internally established statistical 99% confidence range as the acceptance range for this LCS.

Katahdin Analytical Services, Inc. Quality Control Report

Duplicate and Matrix Spike/Matrix Spike Duplicate Results

Client: Tetra Tech NUS

Work Order: WP3877

DUPLICATE RESULTS

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Parameter	Katahdin Sample No	Sample Measurements						Acceptance Range for RPD (%)	Concentration or Quantity				Matrix Spike Recovery (%)				
		Units	Rep		Mean Conc	RPD (%)	Units		Sampl Only	Spike Added	Sample +Spike Dup 1	Sample +Spike Dup 2	Sample +Spike Dup 1	Sample +Spike Dup 2	Acceptance Range (%)	RPD (%)	Acceptance Range (%)
			1	2													
Nitrate - N	WP3877-12	mg/L	0.072	0.067	0.070	7.2	0-20	mg/L	0.07	0.5	0.362		58.0	*	75-125		0-20
Sulfate	WP3877-24	mg/L	15.892	15.814	15.853	0.5	0-20	mg/L	15.9	10	24.2		83.0		75-125		0-20

RPD = Relative percent difference, which is the absolute value of the difference between two replicate results divided by the mean concentration then multiplied by 100%.

DATA QUALITY COMMENTS:

Results of all quality control measurements are within the laboratory or contract specified acceptance range except as noted. The laboratory does not use the sample duplicate and matrix spike acceptance ranges as acceptance criteria for a specific analysis. Sample duplicate and matrix spike data are used to evaluate method performance in the environmental sample matrix only. Please refer to LCS data for assessment of quality control for each parameter.

* Matrix spike recovery is outside the laboratory's specified acceptance range indicating potential sample matrix interference and potential bias of reported value for this parameter.

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;091399

Lab Name: Katahdin Analytical Services

SDG No.: WP3877

Lab File ID: Z2065

Lab Sample ID: SBLK;091399

Instrument ID: 5972-Z

Date Extracted: 9/13/99

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 09/16/99

Matrix: (soil/water) WATER

Time Analyzed: 20:31

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;091399	LCS;091399	Z2070	9/17/99	10:59:00 AM
LCSD;091399	LCSD;091399	Z2071	9/17/99	11:47:00 AM
34GLM0201	WP3877-2	Z2138	9/24/99	11:10:00 PM
34GLM0301	WP3877-3	Z2139	9/24/99	11:56:00 PM
34GLM0201D	WP3877-4	Z2140	9/25/99	12:44:00 AM
14GLM0301D	WP3877-5	Z2141	9/25/99	1:32:00 AM
14GLM0201	WP3877-11	Z2142	9/25/99	2:19:00 AM
14GLM0301	WP3877-12	Z2143	9/25/99	3:06:00 AM
19GLO1B01	WP3877-13	Z2144	9/25/99	3:54:00 AM
19GLM0301	WP3877-14	Z2145	9/25/99	4:42:00 AM
19GLM0601	WP3877-15	Z2146	9/25/99	5:30:00 AM
19GLO1D01	WP3877-16	Z2148	9/27/99	9:45:00 AM
19GLO1C01	WP3877-17	Z2149	9/27/99	10:32:00 AM
18GLO1F01	WP3877-18	Z2150	9/27/99	11:18:00 AM
18GLM03D01	WP3877-19	Z2151	9/27/99	12:04:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308
Proj. ID: CNC CHARLESTON

Lab Number: SBLK;091399
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;091399	AQ	-	-	9/13/99	LAP	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	66	%	1.0		
2-FLUOROBIPHENYL	67	%	1.0		
TERPHENYL-D14	66	%	1.0		

Report Notes:

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;091399	Z2070	9/17/99	10:59	KRT	AQ	8270
LCSD;091399	Z2071	9/17/99	11:47	KRT	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
2-METHYLNAPHTHALENE	50	30.5	30.4	*61	*61	70-130	0	30
ACENAPHTHENE	50	31.7	30.9	*63	*62	70-130	1.6	30
ACENAPHTHYLENE	50	31.8	31.2	*64	*62	70-130	3.2	30
ANTHRACENE	50	33.9	31.2	*68	*62	70-130	9.2	30
BENZO[A]ANTHRACENE	50	34.2	31.8	*68	*64	70-130	6.1	30
BENZO[A]PYRENE	50	33.7	31.2	*67	*62	70-130	7.8	30
BENZO[B]FLUORANTHENE	50	30.0	27.5	*60	*55	70-130	8.7	30
BENZO[G,H,I]PERYLENE	50	34.9	33.7	70	*67	70-130	4.4	30
BENZO[K]FLUORANTHENE	50	39.4	35.2	79	70	70-130	12	30
CHRYSENE	50	38.2	35.3	76	71	70-130	6.8	30
DIBENZ[A,H]ANTHRACENE	50	33.1	32.3	*66	*65	70-130	1.5	30
FLUORANTHENE	50	34.6	32.2	*69	*64	70-130	7.5	30
FLUORENE	50	31.9	30.8	*64	*62	70-130	3.2	30
NO[1,2,3-CD]PYRENE	50	34.8	35.0	70	70	70-130	0	30
NAPHTHALENE	50	31.2	31.0	*62	*62	70-130	0	30
PHENANTHRENE	50	34.0	32.0	*68	*64	70-130	6.1	30
PYRENE	50	36.4	33.3	73	*67	70-130	8.6	30

RPD = (lcs rec - lcsd rec) / [(lcsd rec + lcsd rec)/2] * 100

* Out of Limits

1

0000086

4B
SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;091499

Lab Name: Katahdin Analytical Services

SDG No.: WP3877

Lab File ID: Z2054

Lab Sample ID: SBLK;091499

Instrument ID: 5972-Z

Date Extracted: 9/14/99

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 09/16/99

Matrix: (soil/water) WATER

Time Analyzed: 11:41

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;091499	LCS;091499	Z2055	9/16/99	12:28:00 PM
18GLM0201	WP3877-20	Z2152	9/27/99	12:51:00 PM
18GLM0201D	WP3877-21	Z2153	9/27/99	1:36:00 PM
18GLO1E01	WP3877-22	Z2154	9/27/99	2:23:00 PM
18GLM0101	WP3877-23	Z2155	9/27/99	3:09:00 PM
23GLM0201	WP3877-24	Z2156	9/27/99	3:56:00 PM
23GLX0201	WP3877-25	Z2157	9/27/99	4:41:00 PM
23GLM0301	WP3877-26	Z2158	9/27/99	5:29:00 PM
18GLM0201MS	WP3877-20MS	Z2159	9/27/99	6:15:00 PM
18GLM0201MSD	WP3877-20MSD	Z2160	9/27/99	7:01:00 PM
18GLM0201D	WP3877-21DL	Z2161	9/27/99	7:48:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Owen Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: SBLK;091499
SDG: WP3877
Report Date: 10/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: EPA 8270
Date Analyzed: 9/16/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;091499	AQ	-	-	9/14/99	DS	EPA 3510	SW

Compound	Result	Units	DF	Sample PQL	Method PQL
NAPHTHALENE	<10	ug/L	1.0	10	10
2-METHYLNAPHTHALENE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
PYRENE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
NITROBENZENE-D5	54	%	1.0		
2-FLUOROBIPHENYL	56	%	1.0		
TERPHENYL-D14	66	%	1.0		

Report Notes: none

Katahdin Analytical Services

8270 LCS Recovery Sheet

Lab File: Z2055

Sample ID: LCS;091499

Date Run: 9/16/99

Analyst: KRT

Time Injected: 12:28:00 PM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
2-METHYLNAPHTHALENE	50	28.8	*58	70-130
ACENAPHTHENE	50	30.1	*60	70-130
ACENAPHTHYLENE	50	29.9	*60	70-130
ANTHRACENE	50	30.4	*61	70-130
BENZO[A]ANTHRACENE	50	31.6	*63	70-130
BENZO[A]PYRENE	50	31.1	*62	70-130
BENZO[B]FLUORANTHENE	50	28.6	*57	70-130
BENZO[G,H,I]PERYLENE	50	28.7	*57	70-130
BENZO[K]FLUORANTHENE	50	35.5	71	70-130
CHRYSENE	50	35.8	72	70-130
DIBENZ[A,H]ANTHRACENE	50	28.0	*56	70-130
FLUORANTHENE	50	32.5	*65	70-130
FLUORENE	50	30.7	*61	70-130
INDENO[1,2,3-CD]PYRENE	50	28.8	*58	70-130
NAPHTHALENE	50	29.8	*60	70-130
PHENANTHRENE	50	31.3	*62	70-130
PYRENE	50	32.2	*64	70-130

* Out of Limits

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0000089

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3877-20	Z2152	9/27/99	12:51:00 PM	SW	AQ	8270_99
WP3877-20MS	Z2159	9/27/99	6:15:00 PM	SW	AQ	8270_99
WP3877-20MSD	Z2160	9/27/99	7:01:00 PM	SW	AQ	8270_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
CHRYSENE	0	50	50	43.9	46.2	88	92	60-140	5.1	30
ACENAPHTHENE	117	50	50	208	198	*181	*161	60-140	4.9	30
ACENAPHTHYLENE	0	50	50	45.7	43.6	91	87	60-140	4.7	30
ANTHRACENE	0	50	50	44.2	45.0	88	90	60-140	1.8	30
BENZO[A]ANTHRACENE	0	50	50	42.7	45.9	85	92	60-140	7.2	30
BENZO[A]PYRENE	0	50	50	41.4	43.6	83	87	60-140	5.2	30
BENZO[B]FLUORANTHENE	0	50	50	40.2	42.4	80	85	60-140	5.3	30
2-METHYLNAPHTHALENE	131	50	50	237	213	*212	*164	60-140	11	30
BENZO[K]FLUORANTHENE	0	50	50	43.6	48.8	87	98	60-140	11	30
PYRENE	0	50	50	42.2	45.0	84	90	60-140	6.4	30
DIBENZ[A,H]ANTHRACENE	0	50	50	40.9	40.6	82	81	60-140	0.74	30
FLUORANTHENE	0	50	50	46.3	50.4	92	101	60-140	8.5	30
FLUORENE	47.5	50	50	120	118	*145	140	60-140	1.7	30
INDENO[1,2,3-CD]PYRENE	0	50	50	43.0	40.8	86	82	60-140	5.2	30
1-METHYLNAPHTHALENE	5.09	50	50	47.4	43.6	84	77	60-140	8.4	30
PHENANTHRENE	23.0	50	50	82.3	84.6	119	123	60-140	2.8	30
BENZO[G,H,I]PERYLENE	0	50	50	41.5	40.1	83	80	60-140	3.4	30

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBCLKF11A

Lab Name: Katahdin Analytical Services

SDG No.: WP3877

Lab File ID: F1820

Lab Sample ID: VBCLKF11A

Date Analyzed: 09/11/99

Time Analyzed: 10:00

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5972-F

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSF11A	LCSF11A	F1819	9/11/99	8:56:00 AM
34TL00201	WP3877-6	F1822	9/11/99	11:26:00 AM
14TL00201	WP3877-7	F1823	9/11/99	12:03:00 PM
18TL00101	WP3877-8	F1824	9/11/99	12:40:00 PM
34GLM0201	WP3877-2	F1828	9/11/99	3:06:00 PM
34GLM0301	WP3877-3	F1829	9/11/99	3:42:00 PM
34GLM0201D	WP3877-4	F1830	9/11/99	4:19:00 PM
14GLM0301D	WP3877-5	F1831	9/11/99	4:56:00 PM
23TL00101	WP3877-9	F1832	9/11/99	5:32:00 PM
14GLM0201	WP3877-11	F1833	9/11/99	6:08:00 PM
14GLM0301	WP3877-12	F1834	9/11/99	6:45:00 PM
19GLO1B01	WP3877-13	F1835	9/11/99	7:22:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF11A
SDG: WP3877
Report Date: 10/5/99
PO No.: N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/11/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF11A	AQ	-	-	9/11/99	JSS	5030	JSS

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	101	%	1.0		
1,2-DICHLOROETHANE-D4	94	%	1.0		
LUENE-D8	86	%	1.0		
P-BROMOFLUOROBENZENE	87	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F1819

Sample ID: LCSF11A

Date Run: 9/11/99

Analyst: JSS

Time Injected 8:56:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	54.3	108	60-140
BENZENE	50	46.7	93	60-140
ETHYLBENZENE	50	48.3	96	60-140
MTBE	50	49.7	99	60-140
NAPHTHALENE	50	44.4	89	60-140
TOLUENE	50	48.3	96	60-140
TOTAL XYLENES	150	143	95	60-140

*** Out of Limits**

1

0000083

4A
VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKF13A

Lab Name: Katahdin Analytical Services

SDG No.: WP3877

Lab File ID: F1839

Lab Sample ID: VBLKF13A

Date Analyzed: 09/13/99

Time Analyzed: 10:59

GC Column: RTX-624 ID: 0.18 (mm)

Heated Purge: (Y/N) N

Instrument ID: 5972-F

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSF13A	LCSF13A	F1838	9/13/99	10:07:00 AM
19GLM0301	WP3877-14	F1840	9/13/99	11:52:00 AM
19GLM0601	WP3877-15	F1841	9/13/99	12:28:00 PM
19GLO1D01	WP3877-16	F1842	9/13/99	1:05:00 PM
19GLO1C01	WP3877-17	F1843	9/13/99	1:41:00 PM
18GLO1F01	WP3877-18	F1844	9/13/99	2:17:00 PM
18GLM03D01	WP3877-19	F1845	9/13/99	2:54:00 PM
18GLM0201	WP3877-20	F1846	9/13/99	3:30:00 PM
18GLM0201D	WP3877-21	F1847	9/13/99	4:07:00 PM
18GLO1E01	WP3877-22	F1848	9/13/99	4:43:00 PM
18GLM0101	WP3877-23	F1849	9/13/99	5:20:00 PM
23GLM0201	WP3877-24	F1850	9/13/99	5:56:00 PM
23GLX0201	WP3877-25	F1851	9/13/99	6:32:00 PM
23GLM0301	WP3877-26	F1852	9/13/99	7:09:00 PM
18GLM0201MS	WP3877-20MS	F1853	9/13/99	7:45:00 PM
18GLM0201MSD	WP3877-20MSD	F1854	9/13/99	8:22:00 PM



KATAHDIN ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Paul Calligan
Tetra Tech NUS
1401 Oven Park Dr.
Suite 102
Tallahassee, FL 32308

Proj. ID: CNC CHARLESTON

Lab Number: VBLKF13A
SDG: WP3877
Report Date: 10/5/99
PO No. : N7912-P99264
Project: CTO #68
% Solids: N/A
Method: SW8260
Date Analyzed: 9/13/99

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKF13A	AQ	-	-	9/13/99	KMC	5030	KMC

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZENE	<5	ug/L	1.0	5	5
TOLUENE	<5	ug/L	1.0	5	5
1,2-DIBROMOETHANE	<5	ug/L	1.0	5	5
ETHYLBENZENE	<5	ug/L	1.0	5	5
NAPHTHALENE	<5	ug/L	1.0	5	5
MTBE	<5	ug/L	1.0	5	5
TOTAL XYLENES	<5	ug/L	1.0	5	5
DIBROMOFLUOROMETHANE	95	%	1.0		
1,2-DICHLOROETHANE-D4	93	%	1.0		
TOLUENE-D8	82	%	1.0		
P-BROMOFLUOROBENZENE	83	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: F1838

Sample ID: LCSF13A

Date Run: 9/13/99

Analyst: KMC

Time Injected 10:07:00 AM

Matrix: AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,2-DIBROMOETHANE	50	50.6	101	60-140
BENZENE	50	40.5	81	60-140
ETHYLBENZENE	50	44.0	88	60-140
MTBE	50	46.8	94	60-140
NAPHTHALENE	50	41.0	82	60-140
TOLUENE	50	42.6	85	60-140
TOTAL XYLENES	150	130	87	60-140

*** Out of Limits**

1

0000096

Katahdin Analytical Services

MS/MSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
WP3877-20	F1846	9/13/99	3:30:00 PM	KMC	AQ	8260_99
WP3877-20MS	F1853	9/13/99	7:45:00 PM	KMC	AQ	8260_99
WP3877-20MSD	F1854	9/13/99	8:22:00 PM	KMC	AQ	8260_99

Compound Name	Native (ug/L)	MS Spk Amount (ug/L)	MSD Spk Amount (ug/L)	MS Result (ug/L)	MSD Result (ug/L)	MS REC (%)	MSD REC (%)	Recovery Limits (%)	RPD (%)	RPD Limit (%)
TOTAL XYLENES	4.02	150	150	117	114	76	73	60-140	2.6	20
TOLUENE	0	50	50	37.8	37.9	76	76	60-140	0.26	20
NAPHTHALENE	7.44	50	50	60.4	60.4	106	106	60-140	0	20
MTBE	0	50	50	45.5	46.8	91	94	60-140	2.8	20
ETHYLBENZENE	0.760	50	50	39.2	37.8	77	74	60-140	3.6	20
BENZENE	2.90	50	50	39.2	38.6	72	71	60-140	1.5	20
1,2-DIBROMOETHANE	0	50	50	49.2	50.7	98	101	60-140	3.0	20

APPENDIX D
AQUIFER CALCULATIONS

SUMMARY OF SLUG TEST

SOUTH CAROLINA Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #: 01089 **COUNTY:** Charleston
FACILITY NAME: Site 14, Quarters S, Charleston Naval Complex

Slug Data

See Appendix: Final Zone B RFI Report **Table:** 2.3 and 2.4 **Figure:** for a list of all data measurements.
(water level logs, etc.) (Complete as appropriate.)

Water Level Recovery Data was measured by See Final Zone B RFI Report
(Hermit Data Logger, Manually with Water Level Indicator, etc.) (List Method).

Complete the following table for each well tested.

COMPLETE A SECOND SHEET IF MORE THAN FOUR WELLS ARE TESTED

Slug Test Conducted in well(s) number	NBCB-GDB-001	NBCB-GDB-002	NBCB-GDB-004	NBCB-GDB-04D
Initial Rise/Drawdown in well (feet)				
radius of Well Casing (feet)				
Effective Radius of Well (feet)				
Static Saturated Aquifer Thickness (feet)				
Length of Well Screen (feet)				
Static Height of Water Column in Well (ft)				

Calculations

See Appendix: Final Zone B RFI Report **Table** **Figure:** for calculations. (Complete as appropriate.)

The method for aquifer calculations was: Bouwer and Rice (1976) for (i.e. Bouwer-Rice, Cooper, etc.)
shallow, Cooper for deep

Calculated values by well were as follows:

Slug Test Conducted in well(s) number	NBCB-GDB-001	NBCB-GDB-002	NBCB-GDB-004	NBCB-GDB-04D
Hydraulic Conductivity	0.00134	0.792	7.92	0.276 (deep well)

Thickness of the aquifer used to calculate hydraulic conductivity was feet.
The aquifer is confined semi-confined X water table (Check as appropriate.)
The estimated seepage velocity is 10.31 feet per year based on
a hydraulic conductivity of 2.9 , a hydraulic gradient of 0.00458 , and
a porosity of 0.47 per cent for sandy soil (list type i.e., silty sand, clay, etc.).

CALCULATION WORKSHEET

PAGE 1 OF 1

CLIENT <u>Charleston Naval Complex</u>		JOB NUMBER <u>0092 0141 E60150105</u>	
SUBJECT <u>Estimated Seepage Velocity</u>			
BASED ON		DRAWING NUMBER	
BY <u>R. Ayers</u>	CHECKED BY	APPROVED BY	DATE <u>10-13-99</u>

Assume groundwater flow follows Darcy's Law

$$V = \left(\frac{K}{n} \right) \times i$$

V = Average velocity

K = hydraulic conductivity = 2.90 ft/day

n = effective porosity = 0.47
(default for sandy soils)

i = hydraulic gradient = 0.00458 ft/ft

$$V = \frac{(2.90 \text{ ft/day}) \times 0.00458 \text{ ft/ft}}{0.47}$$

$$= 0.008 \text{ ft/day}$$

APPENDIX E

SOIL AND WATER DISPOSAL MANIFESTS

All soil cuttings and purge water were containerized, the containers labeled, and the containers moved to a staging area for final disposal by Charleston Naval Complex.

APPENDIX F
RBCA CALCULATIONS

Minimum Construction Worker RBSLs

	Dermal	Incidental Ingestion	Inhalation	Minimum
	RBSL	RBSL	RBSL	RBSL
	mg/L	mg/L	mg/L	mg/L
Benzene	0.85	68.52	0.15	0.15
Toluene	23.98	5677.78	5.38	5.38
Ethylbenzene	6.05	2838.89	14.50	6.05
Xylene	102.33	56777.78	NA*	102.33
Naphthalene	1.63	1135.56	2.63	1.63
MTBE	25.92	141.94	293.44	25.92

*No inhalation reference dose is available for xylenes; therefore, no inhalation RBSL can be calculated.

Prepared By: _____

Reviewed By: _____

Construction Worker Dermal RBSLs

	Kow	MW	Kp	B	τ_{event}	c	b	t*	t _{event}	DAevent
			cm/hr	unitless	hr/event			hr	hr/event	
Benzene	199.5262315	78.1	0.11551543	0.392637855	2.87E-01	6.32E-01	6.03E-01	6.90E-01	1	eq 3.3
Toluene	537.0317964	92.1	0.259561335	0.958068292	3.44E-01	1.13E+00	1.31E+00	1.33E+00	1	eq 3.2
Ethylbenzene	1412.537545	106.2	0.569219802	2.256154884	4.13E-01	2.36E+00	4.39E+00	1.70E+00	1	eq 3.2
Xylene*	1584.893192	106.2	0.638675123	2.531447415	4.13E-01	2.63E+00	5.31E+00	1.72E+00	1	eq 3.2
Naphthalene	1995.262315	128.2	0.605452393	2.636638957	5.48E-01	2.73E+00	5.69E+00	2.29E+00	1	eq 3.2
MTBE	15.136	88.15	0.00769788	0.027797704	3.27E-01	3.52E-01	3.20E-01	7.85E-01	1	eq 3.3

	BW	AT	EV	ED	EF	SA	CSF derm	Rfd derm	Target	RBSL	RBSL
	kg	day	events/day	hrs	days/yr	cm ²	(mg/kg-day) ⁻¹	mg/kg-day	Risk or HQ	mg/L	mg/L
Benzene	70	25550	1	1	90	4500	2.99E-02	NA	1.00E-06		8.52E-01
Toluene	70	365	1	1	90	4500	NA	1.60E-01	1.0	2.40E+01	
Ethylbenzene	70	365	1	1	90	4500	NA	9.70E-02	1.0	6.05E+00	
Xylene*	70	365	1	1	90	4500	NA	1.84E+00	1.0	1.02E+02	
Naphthalene	70	365	1	1	90	4500	NA	3.20E-02	1.0	1.63E+00	
MTBE	70	365	1	1	90	4500	NA	5.00E-03	1.0	2.59E+01	

* Kow and MW values for xylene, m-

Prepared By: _____

Reviewed By: _____

Construction Worker Incidental Ingestion RBSLs

	BW	AT	IR	ED	EF	Target	CSF oral	Rfd oral	RBSL
	kg	day	L/day	yrs	days/yr	Risk or HQ			mg/L
Benzene	70	25550	0.01	1	90	1.00E-06	2.90E-02		6.85E+01
Toluene	70	365	0.01	1	90	1.0	NA	2.00E-01	5677.778
Ethylbenzene	70	365	0.01	1	90	1.0	NA	1.00E-01	2838.889
Xylene	70	365	0.01	1	90	1.0	NA	2.00E+00	56777.78
Naphthalene	70	365	0.01	1	90	1.0	NA	4.00E-02	1135.556
MTBE	70	365	0.01	1	90	1.0	NA	5.00E-03	141.9444

Prepared By: _____

Reviewed By: _____

Construction Worker Inhalation RBSLs

Chemical			Dair cm ² /s	Dwater cm ² /s	H cm ³ /cm ³	θ_{scap} cm ³ /cm ³	θ_{scap} cm ³ /cm ³	θ_{ss} cm ³ /cm ³	θ_{ws} cm ³ /cm ³	θ_r cm ³ /cm ³	Deff-cap cm ² /s	Deff-s cm ² /s
Benzene			0.093	1.10E-05	2.26E-01	0.038	0.342	0.33	0.15	0.48	1.35E-05	1.01E-02
Toluene			0.085	9.40E-06	3.01E-01	0.038	0.342	0.33	0.15	0.48	1.07E-05	9.20E-03
Ethylbenzene			0.076	8.50E-06	2.80E-01	0.038	0.342	0.33	0.15	0.48	9.85E-06	8.22E-03
Xylenes			0.072	8.50E-06	2.78E-01	0.038	0.342	0.33	0.15	0.48	9.55E-06	7.79E-03
Naphthalene			0.072	9.40E-06	2.00E-03	0.038	0.342	0.33	0.15	0.48	5.79E-04	7.83E-03
MTBE			0.102	1.05E-05	4.16E-02	0.038	0.342	0.33	0.15	0.48	3.90E-05	1.10E-02

Chemical			hcap cm	hv cm	Deff-ws cm ² /s	Uair cm/sec	δair cm	Lgw cm	W cm	VFwamb mg/m ³ /mg/L	TR (carc)	HI (nonc)
Benzene			5	117	3.18E-04	225	200	122	1500	1.97E-05	1.00E-06	NA
Toluene			5	117	2.54E-04	225	200	122	1500	2.09E-05	NA	1
Ethylbenzene			5	117	2.34E-04	225	200	122	1500	1.79E-05	NA	1
Xylenes			5	117	2.27E-04	225	200	122	1500	1.72E-05	NA	1
Naphthalene			5	117	5.17E-03	225	200	122	1500	2.83E-06	NA	1
MTBE			5	117	8.79E-04	225	200	122	1500	9.99E-06	NA	1

Chemical	TR (carc)	HI (nonc)	BWadult kg	AT yr	SfI (carc) [mg/kg-day] ⁻¹	RfD (nonc) [mg/kg-day]	IR air m ³ /day	EF day/yr	ED yr	RBSLair mg/m ³	H cm ³ /cm ³	RBSLwater mg/L
Benzene	1.00E-06	NA	70	70	2.90E-02	NA	20	90	1	3.43E-02	2.26E-01	0.15
Toluene	NA	1	70	1	NA	1.14E-01	20	90	1	1.62E+00	3.01E-01	5.38
Ethylbenzene	NA	1	70	1	NA	2.86E-01	20	90	1	4.06E+00	2.80E-01	14.50
Xylenes	NA	1	70	1	NA	NA*	20	90	1	NA*	2.78E-01	NA*
Naphthalene	NA	1	70	1	NA	3.71E-04	20	90	1	5.27E-03	2.00E-03	2.63
MTBE	NA	1	70	1	NA	8.60E-01	20	90	1	1.22E+01	4.16E-02	293.443

*No inhalation reference dose is available for xylenes; therefore, no RBSL can be calculated for xylene.

Prepared By: _____

Reviewed By: _____

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA

Department of Health and Environmental Control (DHEC)

Site Data

SITE ID # 01089 COUNTY Charleston
 FACILITY NAME Site 14, Quarters S
 STREET ADDRESS Charleston Naval Complex, North Charleston, SC

Soil Risk Evaluation Data

Figure

TPH	<u>553</u> mg/kg		
Soil % SAND (Estimated)	<u>90</u> %		
Soil % CLAY (Estimated)	<u>4</u> %		
Worst Case	Benzene	mg/kg	Cs
Soil Analyses	Toluene	mg/kg	Cs
	Ethylbenzene	mg/kg	Cs
	Xylenes	mg/kg	Cs
	Naphthalene	<u>1.8</u> mg/kg	Cs
		mg/kg	Cs
Natural Organic Carbon Content	<u>11900</u> mg/kg	foc	
Average Annual Recharge	<u>25</u> cm	Hw	
Distance from highest Soil Impact to water table	<u>91</u> cm	L	
Bulk Density of Soil	<u>1.56</u> g/cc	Bd	1
Wetting Front Suction	<u>10</u> cm	Hf	2
Soil Hydraulic Conductivity	<u>5.60E-03</u> cm/sec	Kf	3
Porosity	<u>0.43</u> decimal %	Φ	4
Residual Water Content	<u>0.03</u> decimal %	Wr	5

List possible human exposure pathways from surface soil.

Soil leaching to groundwater - off-site ingestion or irrigational use of shallow groundwater.

Bold indicates site specific input

Italic indicated estimated value from charts on pages C3 through C5 of SCDHEC soil leaching model guidance.

SOIL LEACHABILITY MODEL FOR NAPHTHALENE **RISK-BASED CORRECTIVE ACTION FOR PETROLEUM RELEASES**

SITE INFORMATION:

Site: **Site 14, Quarters S**
 Location: **Charleston Naval Complex, North Charleston, SC**

Charleston

REFERENCES:

- (1) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 1.
- (2) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 2.
- (3) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Input Parameters.
- (4) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Table 1.
- (5) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 2.
- (6) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 3.
- (7) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 4.
- (8) SCDHEC, RBCA For Petroleum Releases, June 1995, Appendix B, Figure 5.

INPUT:

	NAPHTHALENE	
COC Chemical of Concern	g/cm3	1.56
Bd Soil Bulk Density (1)	mg/L	1.63
Crsbl Risk Based Screening Level	mg/kg	1.8
Cs Concentration of COC in soil	unitless	8
DAF Dilution/Attenuation Factor (2)	mg/kg	11900
foc Organic Carbon Content in Soil (3)	unitless	0.002
H' Henry's Law Constant (4)	cm	-10
Hf Wetting front suction head (always negative) (5)	cm	25
Hw Average Annual Recharge (3)	cm/s	0.0056
Kf Soil Hydraulic Conductivity (6)	ml/g	1543
Koc Soil/Water Partitioning Coefficient (2)	cm	91
L Depth between soil sample with greatest COC concentration to groundwater.	unitless	0.43
Ø Porosity (7)	days	48
t1/2 Biodegradation "half life" (2)	mg/kg	553
TPH Total Petroleum Hydrocarbons, EPA Method 3550	volume fraction	0.03
Wr Residual Water Content (8)		

CALCULATIONS:

Equation Set I - Determine soil pore water concentration resulting from physical partitioning (Cw).

Step 1 - Calculate the total organic carbon content (fcs) of the soil.

$$fcs = (foc + TPH/1.724) * 1E-6 = \underline{0.0122} \text{ decimal \%}$$

Step 2 - Calculate the concentration of COC in soil pore water (Cw) directly in contact with the contaminate soil.

$$Cw = Cs * ((Wr * 1g/cc + Bd) / ((Bd * Koc * fcs) + Wr + ((\theta - Wr) * H))) = \underline{0.00} \text{ mg/l}$$

Equation Set II - Determine the velocity of the soil pore water (Vw)

Step 1 - Calculate the air filled porosity (f) in decimal percent.

$$f = \theta - Wr = \underline{0.40} \text{ decimal \%}$$

Step 2 - Determine the time for water to percolate through the vadose zone soil (from depth of worst case soil sample to the water table at site).

$$t = (f/Kf) * (L - (Hw - Hf)) * (\ln(Hw + ((L - Hf)/(Hw - Hf)))) = \underline{3,298} \text{ seconds}$$

Step 3 - Determine the velocity of the water (Vw) in feet per year.

$$Vw = (L/30.48cm/ft) / (t/31,500,000sec/year) = \underline{28519} \text{ ft/year}$$

Equation Set III - Determine the organic retardation effect (Vc) of the contaminant.

Step 1 - Calculate the soil/water distribution coefficient (Kd) (ml/g) for uncontaminated soil.

$$Kd = Koc * foc * 1E-6 = \underline{18.3617} \text{ ml/g}$$

Step 2 - Calculate the retardation effect of natural soil organic matter on COC migration.

$$Vc = Vw * (1 + ((Bd * Kd)/\theta)) = \underline{422} \text{ ft/year}$$

Equation Set IV - Determine biodegradation rates and provide final COC concentration (Cf) at depth of concern.

Step 1 - Calculate the time (Tc) in days required for the COC to reach groundwater.

$$T_c = 365 \text{ day/yr} * ((L/30.48 \text{ cm/ft})/V_c) = \underline{2.58} \text{ days}$$

Step 2 - Calculate estimated concentration of COC in the soil pore water (Cp) necessary to protect groundwater.

$$C_p = 10^{(\log(C_{rsbl}) + ((T_c/2.3) * (0.693/t_{1/2})))} = \underline{1.69} \text{ mg/l}$$

COC concentration in soil pore water (Cp) is greater than Crsbl, therefore the SSTL must be calculated.

Equation Set V - Calculate the Site Specific Target Level (SSTL) for the COC in soil.

$$\begin{array}{l} \text{Csstl for IAPHTHALENE} \\ \text{in soil} \end{array} = C_p * DAF * (((Bd * Koc * fcs) + W_r + (F * H''')) / (W_r * 1 \text{ g/cc} + 8d)) = \underline{\underline{250.692729}} \text{ mg/kg}$$

PREPARED BY: _____

Date

CHECKED BY: gkr

10/24/99
Date

IN-SITU SOIL RISK EVALUATION

SOUTH CAROLINA
Department of Health and Environmental Control (DHEC)

Site Data

SITE ID #	01089	Charleston
FACILITY NAME	Site 14, Quarters S	

Instructions

Provide results, separately, for each constituent in the worst case soil analysis.

Data

List Constituent: NAPHTHALENE
(BTEX, Naph.)

Bioremediation "half-life"	<u>48</u>	days	t 1/2	1
Soil/water partitioning coefficient	1543	ml/g	K oc	1

Results

				Equation Set	Step
Total Organic Carbon Content	<u>0.0122</u>	decimal %	f cs	I	1
Leachate Concentration	<u>0.003</u>	mg/l	C w	I	2
Air Filled Porosity	<u>0.40</u>	decimal %	f	II	1
Infiltration Rate Time	<u>3,298</u>	seconds	t	II	2
Velocity of Water	<u>28,519</u>	ft/year	V w	II	3
Soil/Water Distribution Coefficient	<u>18.36</u>	ml/g	K d	III	1
Contaminant Percolation Rate	<u>422</u>	ft/year	V c	III	2
Time to Reach Groundwater	<u>2.584</u>	days	T c	IV	1
Concentration reaching Groundwater	<u>1.692</u>	mg/l	C p	IV	2
Site Specific Target Level	250.6927	mg/kg	C sstl	V	

Conclusions

Does concentration of chemical of concern in soil exceed STL? NO

Risk of Human Exposure due to contaminated soil.

YES X NO

IN-SITU SOIL RISK EVALUATION